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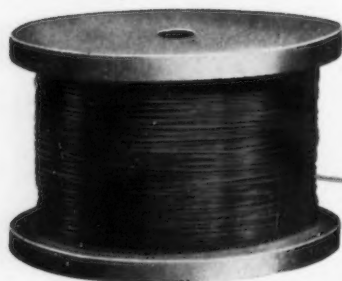
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... THE IRON AGE ...

OCTOBER 8, 1936

ESTABLISHED 1855

Vol. 138, No. 15

Let the Dead Stay Buried!

JEROMER. GEORGE, president of the Aetna-Standard Engineering Co., has commented upon the tendency of government to push industry away from the merit principle in employer-employee relations and to foster a socialized paternalism instead. "One sure way," he says, "for industry to open itself to criticism from the general public, for which it produces goods, is to carry on charitable activities at public expense. I venture to suggest that if professional labor agitators and ambitious reformers could be eliminated and industry persuaded to stick to a pay envelope based on merit, the employer-employee problem would solve itself."

That is probably too much to hope for. There is no stronger addiction than that of spending other people's money, and agitators and reformers alike have formed an incurable habit of doing that under the New Deal's anti-thrift philosophy of waste and want not. Those whose money is being spent are the wage earners, the taxpayers, the owners of businesses or properties, large or small, and all others, except those who are on relief or government work.

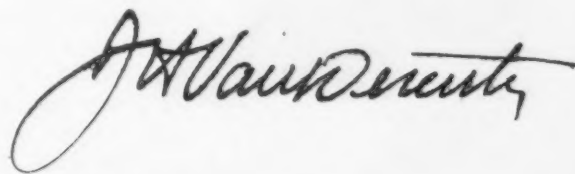
Rexford Tugwell, the President's *alter ego*, has made this philosophy plain in his public condemnation of thrift and his characterization of those who save for rainy day as enemies of the public.

This strange philosophy is not new. More than 50 years ago William G. Sumner dealt with it in his book "What the Social Classes Owe to Each Other." Said Mr. Sumner: "The man who has done nothing to raise himself above poverty finds that the social doctors flock about him, bringing the capital that they have collected from the other class and promising him the aid of the state to give him what the other had to work for . . . The agents who are to direct the state action are, of course, the reformers and the philanthropists.

"On the theory of the social philosophers to whom I have referred, we should get a new maxim of judicious living. Poverty is the best policy. If you get wealth, you will have to support other people; if you do not get wealth, it will be the duty of other people to support you."

"In none of the discussions," observes Professor Sumner, "is any notice taken of the man who works and saves and from whose earnings comes the financing of paternalism. It is this forgotten man who is threatened by every extension of the paternal theory of government. It is he who must *work* and *pay*."

There are enough of us who work and pay and who still believe in the common-sense principles of thrift, honest effort and ambition, to terminate the strange rule of the "cockeyed" philosophers who have disinterred the buried fallacies of past generations and who parade them now as living symbols of human progress.





Your Depreciation

Or You May be Penalized Severely

By PAUL T. NORTON, Jr.

*Professor of Industrial Engineering,
Virginia Polytechnic Institute, Blacks-
burg, Va.*

IN spite of the many discussions of the effects of the Revenue Act of 1936, very little has been written concerning the several ways through which it has increased the importance of the depreciation problem. This may be due to one or both of two reasons: first, the act itself makes no direct change in the method to be used in charging depreciation on tax returns; second, the average owner of depreciating assets does not as yet fully realize the great importance of the depreciation problem. In a previous article (THE IRON AGE, May 7, 1936) it was pointed out that under a system of taxing undistributed profits it becomes much more important that depreciation charges should be adequate, because inadequate depreciation charges will result either in the payment of excessive dividends in order to escape the tax on undistributed profits, or else in the payment of a tax on undistributed book profits which are not really profits at all. In either case, a tax is paid by the corporation or

IN previous articles (THE IRON AGE, Oct. 31, 1935 and May 7, 1936) the author discussed "A Depreciation Fallacy, Tending to Obstruct the Replacement of Obsolete Equipment" and "Depreciation and Corporate Surpluses." In those articles several of the hazards which

its stockholders which would not be collected if the depreciation charges were adequate, and what is perhaps even worse, the corporation may find itself unable to finance the replacement of assets when it becomes clear that replacements should be made.

Another Reason for Adequate Charges

There is still another reason, under the Revenue Act of 1936, for making certain that depreciation charges on tax returns are adequate and also that the information on which these depreciation charges are based is sufficient to satisfy the Bureau of Internal Revenue that the depreciation charges are not excessive. The purpose of this article is to discuss this single possible effect of the Revenue Act of 1936, which may result in a severe penalty in certain cases unless it is handled properly.

Under the Revenue Act of 1936 the dividend paid credit is in general limited to the dividends paid during the fiscal year for which the tax return is made and, except for certain limited exemptions, a surtax on undistributed profits must

Rates Must Be Correct

Under the Revenue Act of 1936

accompany inadequate depreciation charges were explained. In the present article the author discusses still another reason why depreciation charges should be adequate; a possible effect of the Revenue Act of 1936 which may be quite serious under certain circumstances.

be paid on the difference between the amount of the adjusted net income and the amount of the dividends actually paid during this fiscal year. Under previous acts, if the Bureau of Internal Revenue reduced the depreciation charges claimed on the tax return, the amount thus disallowed simply increased the taxable income by exactly the same amount and the taxpayer was compelled to pay the regular corporation income tax on the additional amount. Under the present act the situation may be much more serious in certain cases, because by the time the return is audited by the Bureau it would be too late for the corporation to secure a dividend paid credit for any of this amount, even if it desired to declare additional dividends because of the additional book profits that would result from such a reduction in depreciation charges. Because of the fact that both the normal tax and the surtax on undistributed profits are graduated, any such additional book profits would be taxed at the highest rate applicable to that corporation for that fiscal year, which might mean a 15 per cent normal tax on this amount, plus a 27 per cent surtax on that

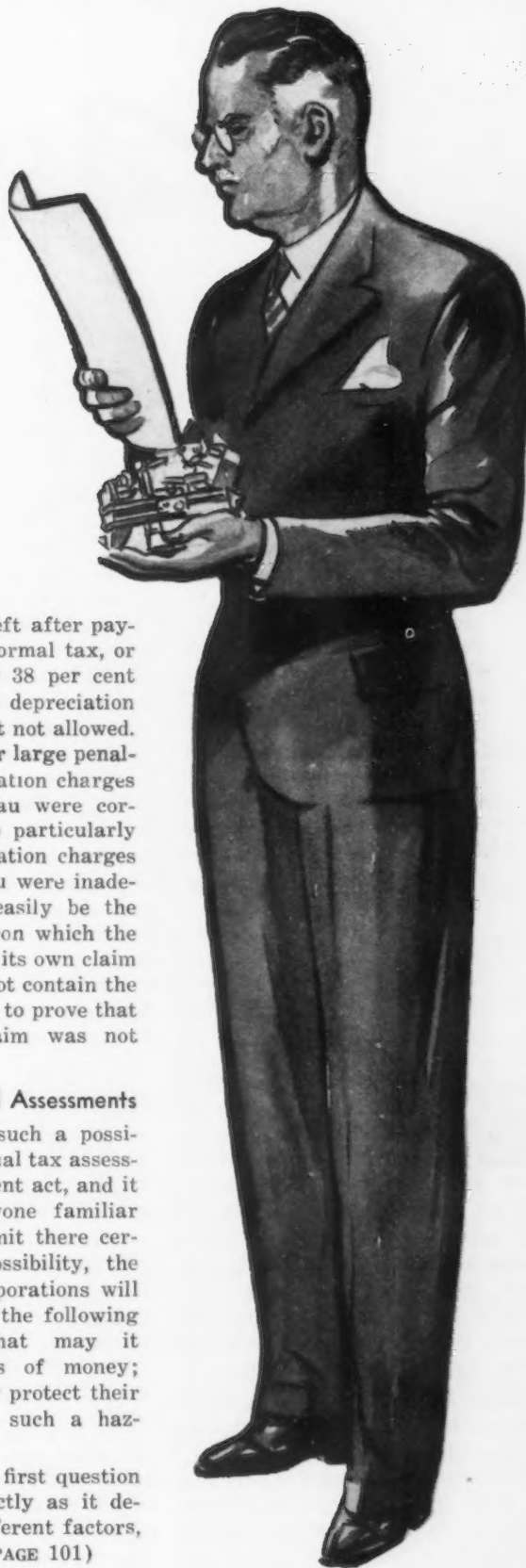
part of the amount left after paying the 15 per cent normal tax, or a total tax of nearly 38 per cent on the amount of the depreciation which was claimed but not allowed. This would be a rather large penalty even if the depreciation charges allowed by the Bureau were correct, and it would be particularly serious if the depreciation charges allowed by the Bureau were inadequate, which could easily be the case if the records upon which the corporation has based its own claim for depreciation did not contain the information necessary to prove that the corporation's claim was not excessive.

Danger of Additional Assessments

If there really is such a possibility of large additional tax assessments under the present act, and it is believed that anyone familiar with the act will admit there certainly is such a possibility, the managers of our corporations will want the answers to the following questions: first, what may it amount to in terms of money; second, how may they protect their corporations against such a hazard?

The answer to the first question cannot be given exactly as it depends upon many different factors,

(CONTINUED ON PAGE 101)



Quiet High Speed Careful Design

NOISE, one definition of which is "a sound which creates a nuisance," is a problem that arises in many fields of engineering. Its elimination in gearing involves painstaking consideration of many details of design and workmanship, as indicated in this abstract of Mr. Schmitter's paper on "Quiet High Speed Gearing," presented during the recent convention cruise of the American Gear Manufacturers Association. The paper

outlines the design and shop practices of the Falk Corp. in dealing with the general problem, and relates to gearing that operates at 2,000 to 10,000 ft. per min. and higher.

Mr. Schmitter's paper is the second on the subject given before the A.G.M.A., the first being an authoritative general discussion by W. E. Sykes, Farrel-Birmingham Co., Inc., Buffalo, in a paper entitled "Gear Noise—Causes and Corrections."

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IT is exceedingly difficult to eliminate or suppress noise in existing gears. . . . The best thing to do with a noisy gear is to abandon it. The disturbances which are the cause of noise must be eliminated at their source. This is possible only when dimension and form is held to such limits as will insure the presence of no motion other than the prescribed one.

Noise in gearing is, to a large degree, the result of recurrent separation of the contacting teeth. It is only possible for such separation to exist when any instantaneous value of relative angular velocity differs from the mean values es-

tablished by the prescribed velocity ratio of the set.

Faulty gear operation may result from the presence of one or more of the following:

A.—Disturbance over which designer has considerable influence.

1.—Those caused by the transient nature of the tooth loading, especially as regards its movement across the face.

2.—Those due to critical speeds. Only certain types of drives are apt to run into criticals. When experience shows that they are likely to be encountered the necessary calculations should be made. Because of the uncertainty of such computations, shafts should be increased so that the expected criticals will

be at least 25 per cent out of the operating range.

Critical vibrations are of two kinds, torsional and linear; the latter being encountered only at extremely high speeds. Torsional vibration is a swinging motion of the gear relative to a stationary axis, but since the gear is revolving, it appears as a variation of angular velocity. Linear vibration corresponds to the oscillation of a tightly stretched string.

B.—Disturbance over which designer has limited influence.

1.—Those due to change from rolling to sliding on the tooth profiles and changes in direction of sliding as engagement moves in and out from the pitch circle. These disturbances are small and are dependent upon the smoothness of the profiles, the efficiency of lubrication and the design of tooth. Their importance is sometimes exaggerated in the treatment of speed increases.

2.—Angular accelerations arising from torsional deflection in shafts and pinion teeth. The drive generally comes in on one side of the pinion with power take-off on opposite side of the gear. When pinion and gear are of nearly equal diameter, torsional deflections compensate. When pinion diameter is small as compared with the gear, the loading of teeth on incoming side of pinion is greatest.

3.—Those due to bending of pinions or shafts. The result is a reversal of stresses in shafts and unequal loading across the face. The recurrent storage and emission of potential energy manifests itself as vibration and noise.

4.—Impacting and splashing of the lubricant.

Gearing Entails and Manufacture

C.—Disturbances over which the gear shop has chief control.

1.—Those due to errors in tooth spacing. These result in variations of angular velocity of the rotating masses. Errors of this kind give much trouble at high speed, particularly noise and excessive loading.

2.—Those due to deviations from the perfect involute. With limited contact ratio the effect is similar to that stated above.

3.—Those due to "runout" of the apex of herringbone gears. This is especially noticeable in the case of heavy pinions and is often present in low ratio gear sets. As a result, the pinion mass must reciprocate at high speed with a variation in the stress intensity of the respective helices together with noise and vibration.

4.—Those due to the presence of flats, burrs, roughness of the teeth, and incomplete surface refinement.

5.—Those arising from misalignment of the axes.

6.—Those due to unbalance in the rotating masses. Also couples due to rotating masses.

D.—Disturbances over which the gear designer has little or no control.

1.—Torque fluctuations due to impulses in the driving means.

2.—Torque fluctuations of the driven machinery; such variations, for example, as exist in pumps, blowers, etc.

3.—Couples due to gyroscopic effect of rotating masses. This phenomenon is uncommon and is experienced only when the gear axis is moved, as in aeroplanes,

By W. P. SCHMITTER

Assistant Chief Engineer, Falk Corp.,
Milwaukee

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ships and motor cars, and sometimes in planetary gear shafts.

The causes for tooth separation are frequently, but not necessarily, due to imperfections in the gears themselves. As has been shown, they may be due to outside conditions which have little or nothing to do with accuracy of gear cutting or design.

A pair of gears is essentially a loosely coupled device. The running clearance between the teeth is necessary to provide room for expansion with increase of temperature and to permit proper lubrication. It is largely because of this clearance that adverse external conditions sometimes interfere with the proper performance of an inherently good gear set.

Essentials of a Quiet High Speed Gear

There is no single specific for gear noise and there are little in the way of criteria upon which to forecast performance. There are, however, certain requirements which, if not satisfied, will certainly lead to disappointment, and yet their apparent complete fulfillment is not altogether a guarantee of a quiet gear. The manufacture of

high-speed gearing is today as much of an art as an exact science despite fruitful gains of the last few years.

From an analysis of the disturbances responsible for gear noise, we may prescribe the following as essential to a quiet operating pair of herringbone gears:

1.—Division of the teeth permanently accurate.

2.—The shafts true, concentric with the teeth, round, and spaced to allow for a proper running clearance.

3.—Revolving parts in correct running balance.

4.—Shafts parallel to each other under all conditions.

5.—Spiral angles correct and matched.

6.—Tooth profiles of correct form to transmit uniform velocity despite deflections that may occur under load.

7.—Tooth surfaces finished smoothly.

8.—The helical design such that there is sufficient overlap and the axial contact migration under load not excessive.

9.—The teeth properly lubricated.

10.—No functional interference arising from elastic distortions of pinion shafts or supports.

These are the primary requirements and some are naturally of greater consequence than others. In the past, however, a few have been overemphasized until they assumed importance entirely out of proportion with their real significance. The space devoted here to

each of them should not be considered indicative of their relative importance, but rather the result of present concerted endeavor along that line.

Division of Teeth Important

The actual step by step division of the gear teeth is of greatest importance and is established primarily in the cutting process. A discussion of the methods available is not within the province of this paper. Suffice it to say that axial index depends not so much upon the particular cutting process used as upon its state of perfection. It is not enough to speak of a hobber or a

upon the inherent accuracy of the machine itself, its state of repair or disrepair, the accuracy of the hobs or cutters, their sharpening, mounting and other variables, all of which play an important role in the production of high-speed gearing.

The method used at the Falk Corp. for high-speed gearing is exclusively that of hobbing of the compensated division type, but not all of these machines are best adapted for high-speed work. Fig. 2 shows a gear hobber used entirely for high-speed gear cutting. Only recently several thousands of dollars were expended in improving the divisional accuracy in order to

In recent years methods of grinding hob threads have been perfected to a degree that tooth-to-tooth lead errors are now commonly held to 0.0002 in. As a result, gear tooth spacing limits are reduced considerably from what was at one time considered acceptable practice.

Preliminary Processes Affect Accuracy

While the accuracy of division depends mainly upon the cutting and refining methods used, practically all of the preliminary processes affect it in some degree. Turning and boring must be held to a high order of accuracy and precau-

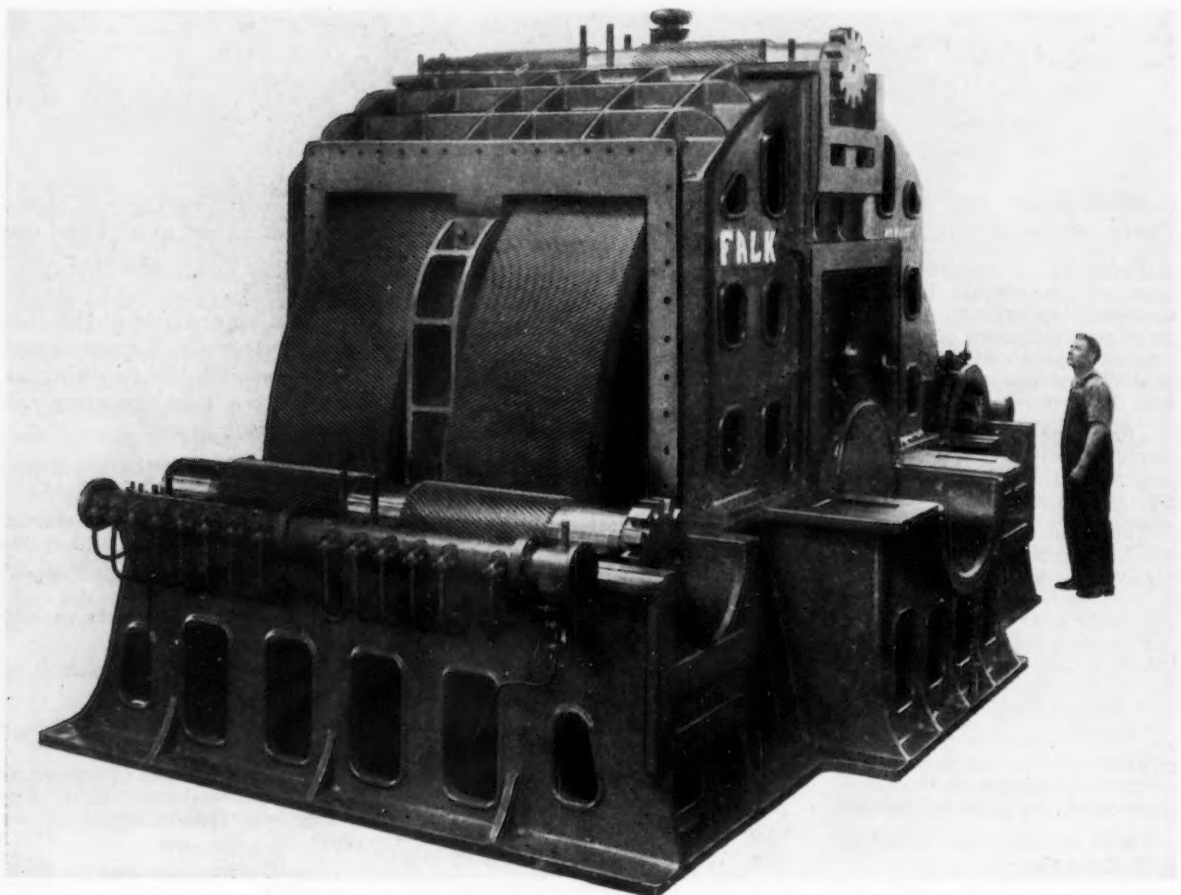


FIG. 1—Three-pinion, 17,500-hp. single reduction gear unit furnished by the Falk Corp. for the United States liners Manhattan and Washington, the largest merchant vessels built in this country. Two units are used in each ship.

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shaper, because all hobbers are not alike and there are similar basic differences in shapers. We have production hobbers, precision hobbers, those using the Creep system, those using compensated division, single cutting hobbers, dual hobbers, horizontal hobbers, vertical hobbers, etc. There are tooth-by-tooth rack shapers, progressive rack shapers and continuous pinion shapers. Even machines of a given type will produce gears with varying degrees of accuracy, depending

gain a few tenths of thousandths of an inch.

Improvements in hobs have aided materially the attaining a closer approach to theoretical perfection.

tions taken not to build up residual stresses which, upon release, mar the character of the finished product. To guard against such contingencies, the gear blanks are heat-treated three times during their manufacture, the purpose of which is to insure this steel being in its most stable metallurgical condition. Any of the ordinary hardening processes making use of a quench are, therefore, inadvisable, except where proportions are small.

The pinions are forged from al-

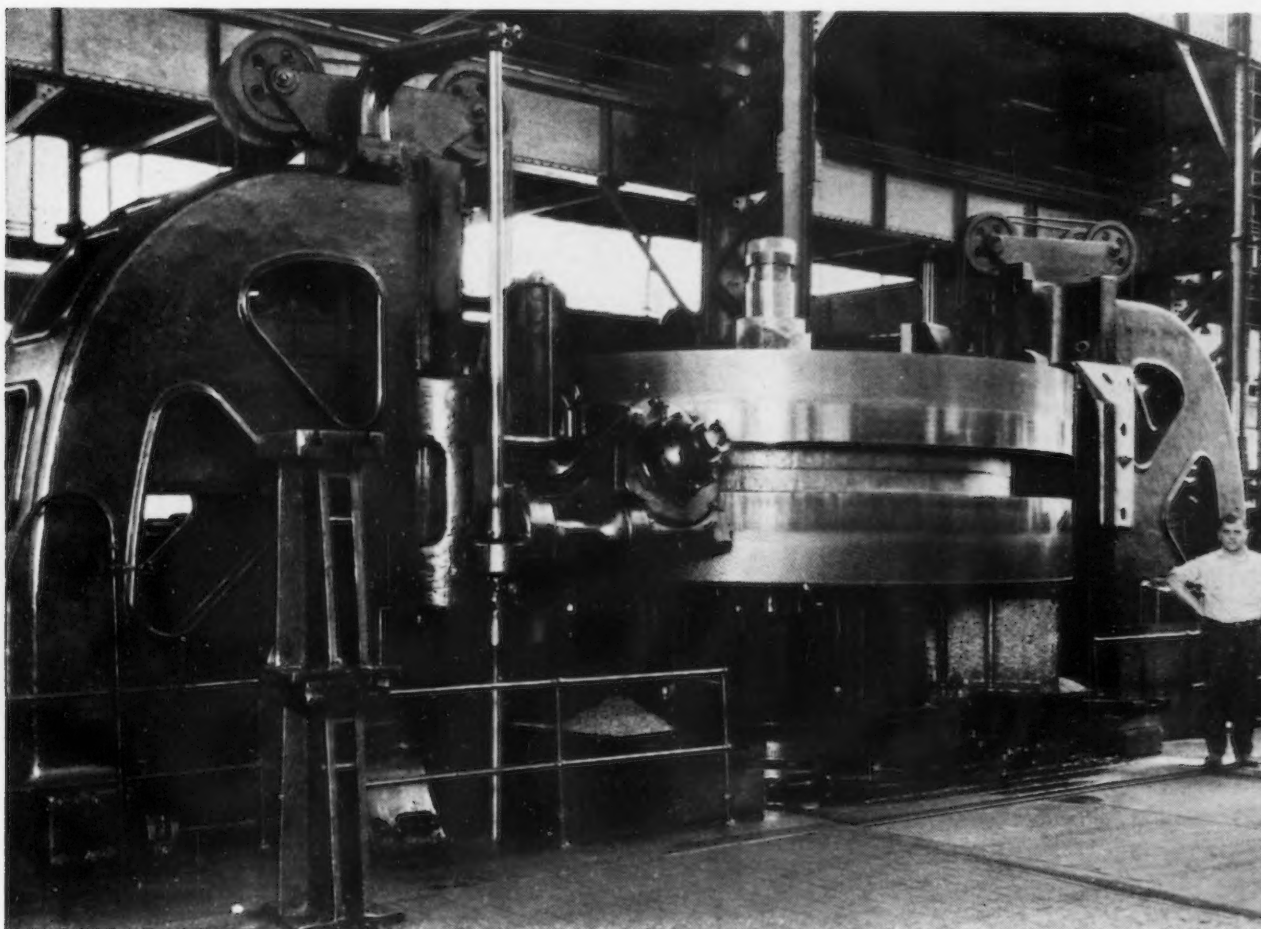
loy steel. Care must be taken in the forging process so that the amount of hammer work in one section is not unduly greater than that in another. With variation in material density cutter resistance is not uniform, thereby directly affecting the windup in the cutter drive. The relative speed of the cutter to blank is intermittently disturbed, causing spacing errors which inevitably lead to noise.

In their normalized condition, alloy steels have a higher yield point

steel ring shrunk upon a cast iron spider. It is open to the objection that high hoop stresses in the ring are relied upon to keep it in intimate contact with the supporting structure. These, together with the compressive stresses between the two members, are a potential source

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FIG. 2—Hobbing of the compensated division type is the method used by the Falk Corp. for high speed gears.



than straight carbon steels and their self-hardening properties make it possible in many cases to avoid a quenching operation. Where greater hardnesses are necessary, the higher drawing temperatures of alloy steels release a greater portion of the quenching stresses, thus leaving it in a more stable condition than possible with straight carbon steels.

Steel Castings for Gears

Three general types of construction are in use for high-speed gears. The oldest makes use of a rolled

of difficulty since they cannot be accurately controlled. Tooth rings have been known to come loose in service and some have even opened up after years of operation. Unless the shrinking operation is very carefully carried out, the stresses will not be uniform. The surfaces first coming in contact with the spider cool faster and friction is too high to permit the ring to adjust itself after the initial set.

* Another construction sometimes used consists of a rolled or cast steel ring welded to a built-up plate structure. In order that the welds

be reliable, the carbon content of the ring should be kept low, as alloying elements are especially undesirable due to air hardening.

A third method makes use of integral steel castings. Contrary to popular belief, a high-grade gear casting is sounder than a forging. In order to produce a forging or plate a billet must first be cast and this is subject to blow holes and secondary shrinks. In the subsequent processes of rolling and forging each small air pocket will be

spread out until it covers an area much greater than that of the original fault. This is known as a seam, which is really a misnomer since it has practically no strength due to the fact that the rolling and forging temperatures are below those required for welding. A defect of this character is much more serious than a blow hole because it is not readily detected in the usual inspection procedure. As it is not of a localized character it generally affects several teeth and leads to early failure.

Gears must be of a form and pro-

portion well adapted to casting. The Falk Corp. has developed a special alloy steel which is excellently suited for cast gears.

Shafts Must Be Accurate

A journal flat will cause cyclic variations in gear centers. A difference in journal diameters produces converging axes. The shaft journals and seats are accordingly ground to very close limits. It is obvious that the path of the tooth is established, not by the geometrical center of the gear, but by its position relative to the journal; high-speed gears, therefore, are always turned and cut after mounting on the shaft.

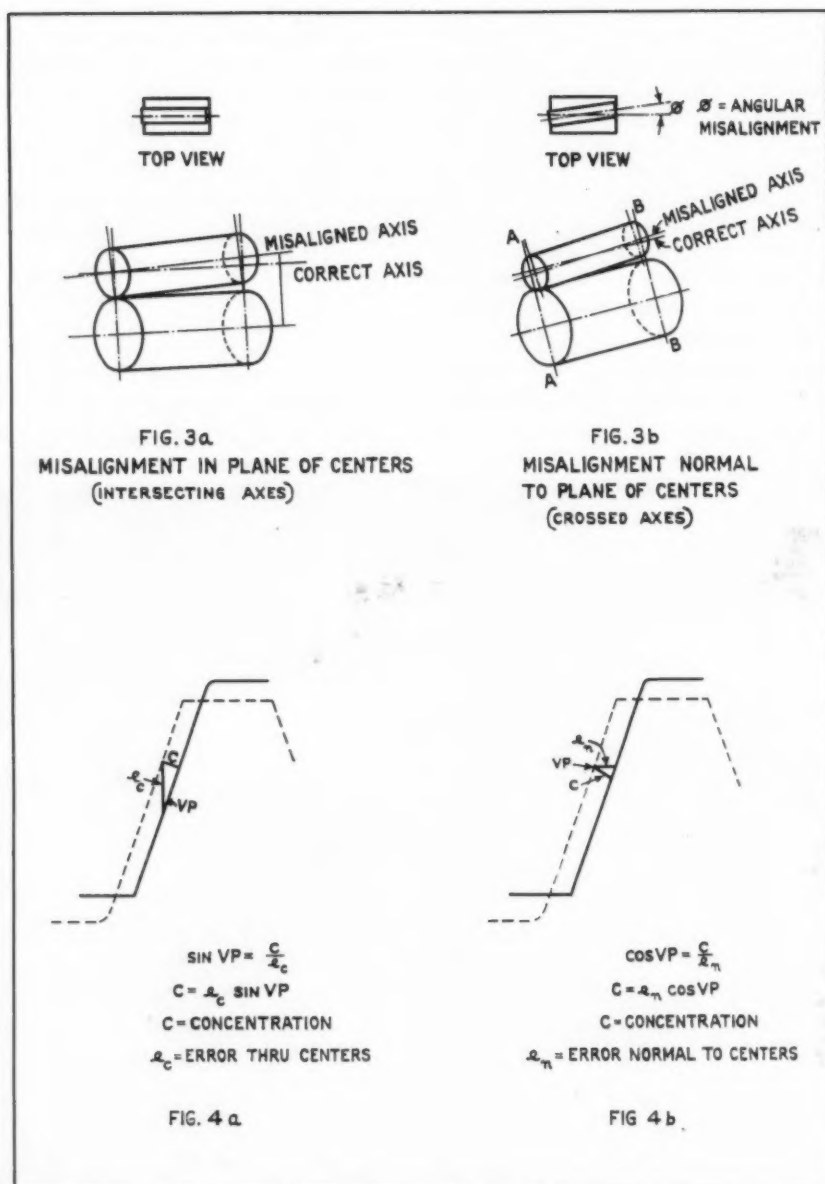
The shaft centers must be such as to allow for adequate backlash. Ordinarily there is considerable latitude here, but there are occasional applications such as already cited where clearance must be held to a minimum.

Proper Balance Necessary

High-speed gears must be properly balanced or they will not run without noise and vibration. A set of gears may rattle when running light for no other reason than because the large gear is out of balance and overruns the pinion during part of each revolution with consequent separation of contact during that part of the rotation. If the gear is properly cut and mounted, the noise will usually disappear when the gear is run under load. Dynamic balancing machines in which the low spot in the wheel is located by an electrical method are used for high-speed gears.

Alinement

If the high-speed herringbone gear is to operate quietly, it must not only be extremely accurate as such, but needs also to be supported in a frame of equal precision and capable of maintaining the correct relationship of pinion and wheel under load. In gears of this type, wide face widths are employed in order to hold the linear velocities as low as practical, and this results in case proportions which require careful attention to detail. Parallelism in both planes is essential, but especially so in the plane normal to the shaft centers. An alinement error in the plane of centers is present when the spacing between pinion and gear shaft bearings is greater on one side than the other. (See Fig. 3a.) As a result of such a condition the load at the



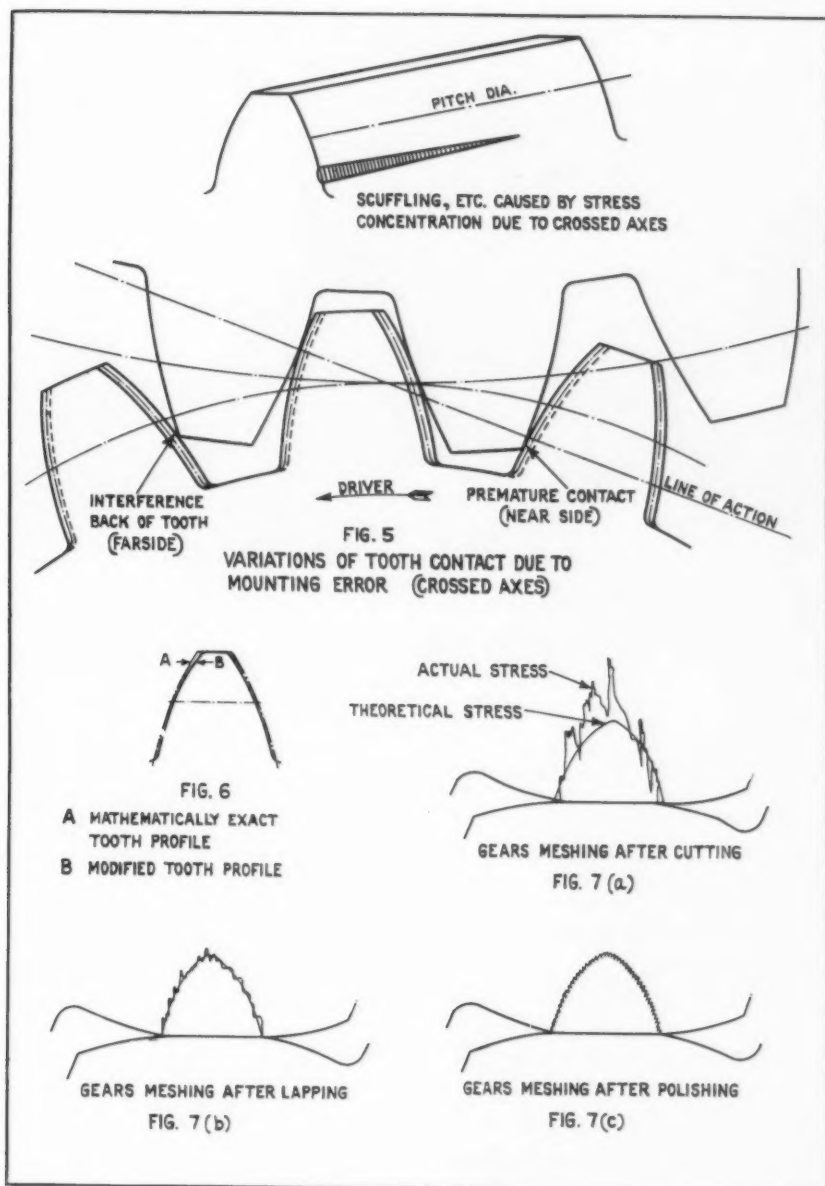
extremity of the face on the short side will be heavier than the designed average. For uni-directional toothed gears the concentration will be equal to approximately the difference between maximum and mean centers multiplied by the sine of the pressure angle, and lighter than the average by the same amount on the opposite side. (See Fig. 4a.) When the error is appreciable, the difference in loading is high because the elastic deflections of the teeth are of a low order.

It is apparent that the relative horizontal slopes of the shaft axes are determined by the extremes of bearing positions relative to their average and that the degree of concentration is a function of the face width. Herringbone gears operate as two individual gears in dividing the load between the right and left-

hand helices (if pinion is not restrained axially), thus for a given face and slope the concentration will be only one-half that of a single helical gear of the same proportions. This sometimes influences the design treatment, particularly as regards the choice of centers and face width.

Fig. 3b shows a gear set with mounting error such that the axes do not lie in a common plane. This type of misalignment is more objectionable than the one just described. Referring to Fig. 4b, it should be noted that the concentration in this case is almost equal to the error, whereas for the other it is from $\frac{1}{4}$ to $\frac{1}{2}$ its magnitude. Pressure angle has but little influence on the extent of the concentration for the crossed axes condition.

Not only is the unit concentra-



tion considerably greater for a given alinement error of the latter form, but of even greater evil is the resulting interference with correct tooth action. The zone of action through a transverse plane at one side of the gear A-A, Fig. 3b, is distorted with reference to that on the opposite side B-B, producing premature engagement on the leading side. Most of the load will be carried here with heavy concentration at the root of the pinion and tip of gear teeth during approach action. Under such condition scuffing is generally experienced together with vibration and noise. At the opposite end, action is delayed and in severe cases no contact is present on the driving side, and there may be interference at the clearance side of the teeth. Fig. 5 illustrates this condition graphically.

Small high-speed gear frames are generally quite rigid. The height from floor to parting line is somewhat greater than that of slow-speed frames due to the necessity of carrying a rather liberal quantity of lubricant below the gears without the inconvenience of outside reservoirs. The wall sections are quite generous so as to avoid drumming. These two circumstances insure the gears against misalignment arising from case distortions.

In the smaller sizes the housings are first bored accurately and then fitted with bronze-back babbitted bearings, manufactured to close tolerances, and arranged to receive the pilot of a line reamer. This tool is constructed so that the pilot bar is entirely within the unit before the reaming operation commences and therefore the original

parallelism of the case is maintained. Sometimes the case is bored, the cover removed, the bearing shells placed in position, and the babbitt linings then bored with the original setting.

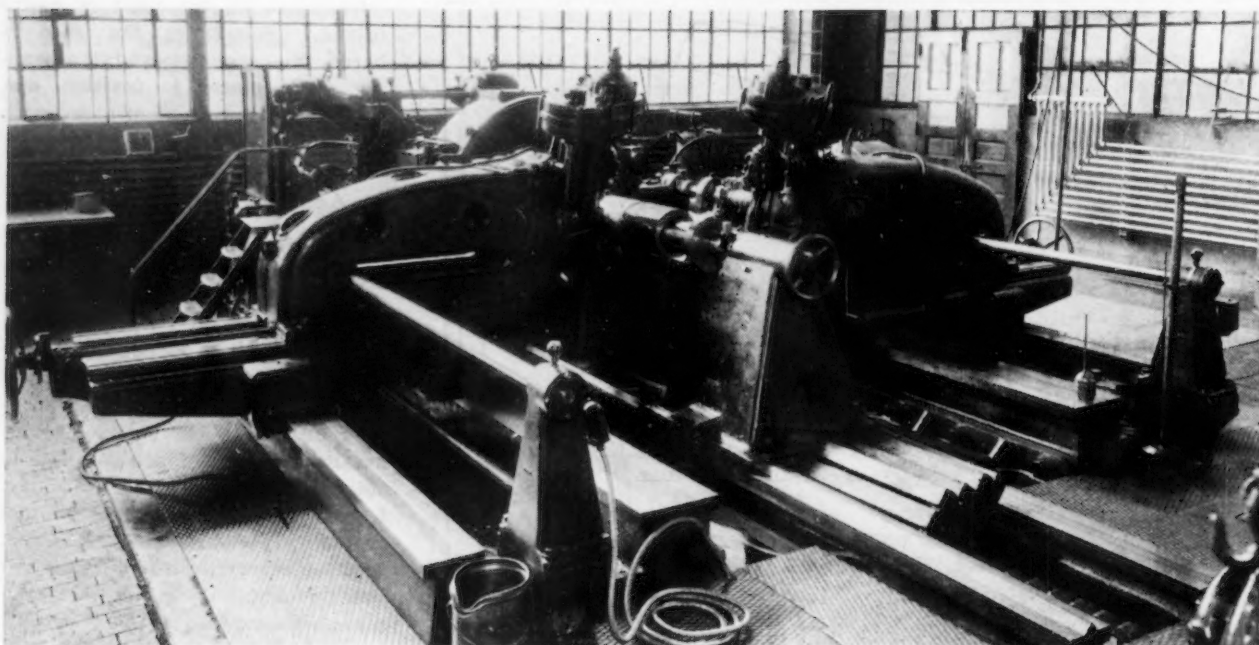
Accuracy of Helical Trace

The general satisfaction of helical gearing for high-speed work is due in a large measure to the fact that the uniform transmission of motion does not depend primarily upon the perfection of the involute profiles, but rather upon the accuracy of the helical trace. Fortunately, accuracy of helical angle is obtained without great difficulty. Errors in pressure angle always produce interference and noise, whereas errors in helical angle frequently cancel each other. If the change gears chosen to cut a pinion result in an angle slightly different from the one specified, the same variation will be found in the case of the mating gear. It is much more important that the helical angles be accurately matched than that their absolute values agree with the specified. Generally the lapping process may be relied upon to correct for slight shortcomings in the matching. It would be better to speak of lead in this respect because it is commonly known that the helix angle varies with each diameter through the teeth, whereas the lead is constant. With the improved lead accuracy now available in the new hobs and higher standards in cutting equipment there is no longer any excuse for error of this type.

Involute Action and Curvature Control

The primary kinematical requirement for gear tooth action is that the common normal to the curves at their point of tangency pass through the pitch point. The involute satisfies this condition in theory and if we were dealing with rigid materials and perfect tooth forms having no clearance, spur gears of that type would transmit perfectly uniform motion. Because of inaccuracies and elastic distortions which prevail in practice, this ideal is not attained.

Fig. 6 shows a tooth curve which has a number of advantages over a mathematically exact involute. The theory upon which this is based is that not only are interferences in tooth action avoided, but in addition highly desirable



compensating effects are obtained under the elastic yielding which takes place under load.

In spur gears such modification must be applied with extreme care because an overdose is productive of the same evil. A few tenths of thousands is all that can be permitted. In a helical gear, properly designed, all phases of tooth action are present at one time. With sufficient overlap, continuity of motion is assured by the helical trace and considerably greater involute deviation is possible. Herringbone gears having an exaggerated de-

DDOUBLE swivel-head horizontal pinion hobbing machine cutting a fine-pitch high speed pinion. This machine was designed and built by the Falk Corp.

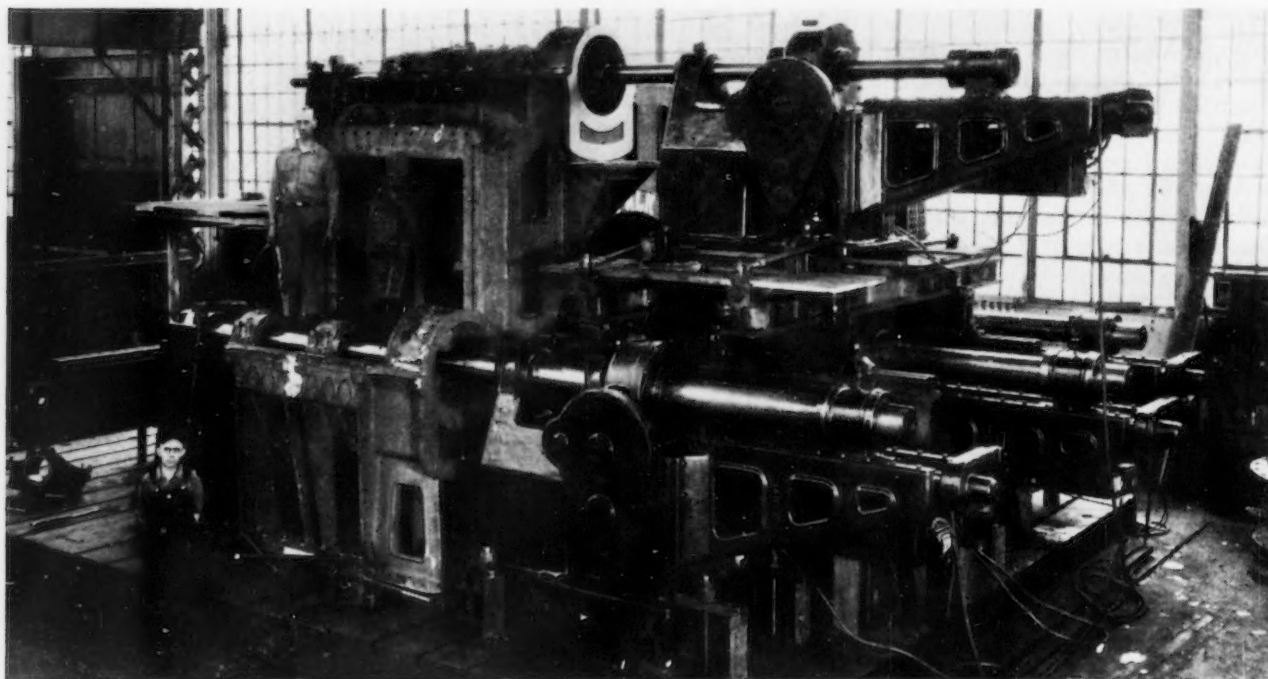
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gree of divergence have been produced for many years. This was incidental to the use of hobs having

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SPECIAL boring machine set up for simultaneously boring the four bearing positions in a case for a three-pinion high speed marine gear drive.

straight-sided sections in the normal plane. No attempt was made to control the amount of deviation which depends mainly on thread angle, position of hob relative to blank and tooth height. As a consequence some gears had far too much, particularly the heavier pitches, with the result that load concentration at the pitch line was excessive. About 1920 Allan Candee, who was at that time a member of the Falk organization, developed mathematically correct formulæ for the manufacture of hobs capable of generating theoret-



ically correct involute profiles.* Considerable experimental work was done along these lines, but at that time refinements in manufacture had not reached a state which would permit the practical application of these principles.

In order to produce a pure involute tooth curve a hob must be of involute form in its transverse plane. The normal section will contain a curve compounded of an involute and the helix. A little less than two years ago development

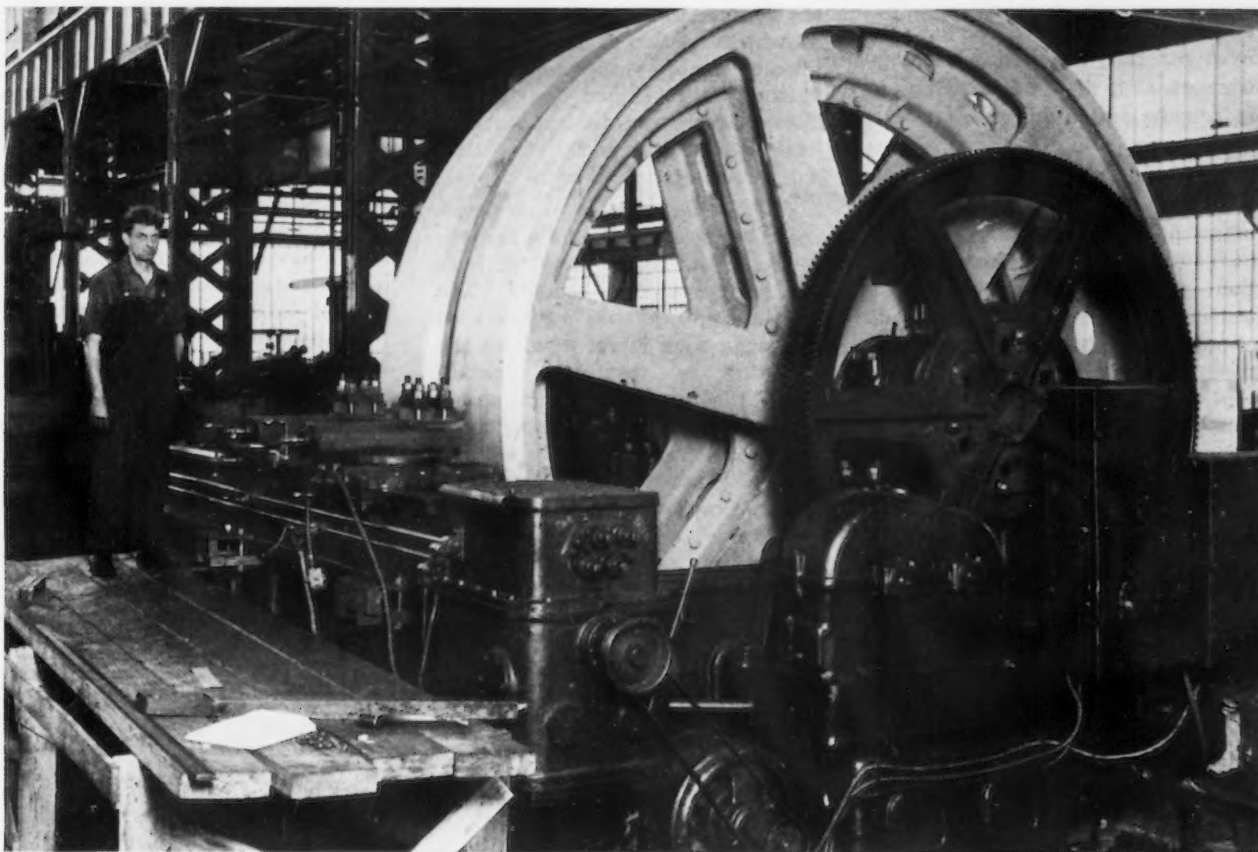
any desired deviation from the theoretical.

Contact Migration

Because of the elastic distortions of the teeth, there may still be present in helical gearing some of the characteristic action of spur gears. As a result of the variations in deflection there exists a similar variation in stress intensity and deformation at the contacting profiles. Since the amount of load carried by the teeth in any particular

energy propagation should be confined to as small a limit as practical.

Two methods of treatment suggest themselves. An extremely rigid tooth may be utilized in order to reduce deflections to a minimum. This involves the use of a high pressure angle. The other course is to maintain a more uniform load distribution in each transverse plane, thus reducing the need for reinforcement in other planes at the instant of tooth transfer. Both



MAIN reduction marine gear, 156 in. in diameter, being turned in a special pit lathe.

work was again resumed in collaboration with Swan Bjornberg and the Illinois Tool Co. Experimental multi-thread hobs were prepared and tried and the results were so satisfactory that a complete line of these hobs was developed.

It has been found that gears cut with improved hobs incorporating these principles operate quieter than did their predecessors. Accordingly the idea is now being applied to single-thread hobs.

By proper modification of the figures obtained from the mount, a hob is produced which will develop a tooth form in the gear having

* U. S. Patent Nos. 1,548,929—1,548,930—1,548,931.

transverse plane changes with the position of the engaging teeth, there must be a transmission of energy and stress axially from one plane to another. If we consider that these gears are moving at high velocities and that these adjustments and readjustments must take place continuously and at a tremendous rate of speed, we get some conception of what is happening during load transfer in high-speed gearing. There is reason to believe that for this class of work

methods are being used successfully at the Falk Corp.

Profiles Smoothed by Lapping

The profile of a gear tooth as it comes from the generator is not a continuous curve, but consists of a series of flats. In the shaping process these flats travel diagonally up the tooth. When produced by the hobbing method, they may be described as diamond-shaped. When these surfaces are brought into contact the distribution of loading will be poor. Fig. 7a shows the imaginary stress distribution resulting under such conditions. It is apparent that when two high points contact, the stress intensity

is considerably greater than the average and other areas within the flattened zone will not take their proportionate share. Furthermore, noise is apt to result from the uneven profiles sliding over each other.

The irregular surface resulting from the cutting process may be worked into a smooth and continuous curve by lapping.

Lapping is still pretty much of an art, although considerable study has been devoted to the matter of abrasives, density of the wheels, type of motion by which the cutting is produced, etc. The practice most generally followed in herringbone gearing at the Falk plant is to run the pinion and gear at slow speed, introducing the lapping compound by brush. The cutting motion between the surfaces being lapped is derived entirely from the incidental sliding of involute action. As a result, the degree of work done at the pitch line is small compared to that at the tip and root, but this is in some degree beneficial. The pitch line is established as a base and lapping continues from there to the two extremes of the profile. When properly carried out, it decreases the possibility of any point on the tooth standing proud of the involute and affecting the uniformity of motion established by the helical trace.

Where the gear cutting is of a very high order, this type of lapping is quite successful and rather elaborate machines have been developed for this purpose. The Drummond process, in which the combination sliding of crossed axes is used, has been found very effective for small gearing.

Polishing Also Employed

The gears as they leave the lapper have a satin-like finish. Recently the Falk Corp. has been using a further refining procedure, the purpose of which is to reduce the surface to a specular condition at which friction is limited to its lowest possible values and to still further improve load distribution. Two separate and distinct methods have proved successful, but they will not be discussed in this paper.

While this process was developed primarily to eliminate the tendency of the tips to scuff at high speeds, it has other benefits. The resistance to pitting is increased somewhat as a direct result of the reduction in maximum contact stress. Fig. 7c illustrates the stress distribution on a loaded gear tooth having such an extremely smooth finish. There appears likewise to be some improvement in operating characteristics apparently due to the greater ease with which the profiles slide over each other. It is a difficult matter to state at this time just how much improvement

is due to the polished condition of the teeth, but the improved gears processed in this fashion have been unusually quiet. Tests are now under way to determine the extent of increase in load-carrying capacity. These may be supplemented with noise tests.

Lubrication

For high-speed gearing, spray lubrication at the mesh point is still considered the best practice. Considerable progress has been made with pan type controlled, but sprayless, lubrication invented by P. C. Day, and velocities of 5000 to 6000 ft. per min. have been used successfully.

Particular care must be used to assure that the lubricant is kept clean and pure, since many of the difficulties met with arise from the presence of abrasives and other foreign elements carried in the oil. Gears have been known to produce a high metallic note when the quantity of lubricant was insufficient, indicating that some cushioning action is derived from the oil.

In this discussion much emphasis has been placed on the need for accuracy in what may appear to the uninitiated as irrelevant detail. Those engaged in this endeavor have learned long ago that quiet gears are possible only by complete exploration of all the circumstances encountered in their manufacture.

Fundamentals of Tool and Fixture Design

By CHARLES J. MARTIN

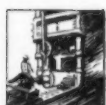
*Production Engineer, Ex-Cell-O
Aircraft & Tool Corp., Detroit*

THE material in this paper, which was read before the Detroit Section of the American Society of Tool Engineers on Sept. 10, is based largely on Mr. Martin's 18 years experience with the Ford Motor Co. Mr. Martin entered the company as a tool maker, in which department he remained for 11½ years before going into the special machinery engineering department. Of the 6½ years spent

there, he was in charge of the department for the last year and a half, finally becoming assistant chief draftsman for the Ford Motor Co. in charge of all production equipment, a position he held for 10 years. He has been with the Ex-Cell-O organization for approximately 2 years; thus he has seen both sides of the machinery picture, that of the buyer and that of the seller.

the head of each department who outline the operations of parts to be manufactured in conjunction with production foremen, thereby eliminating any friction which may arise between the machinery department and the operating department. With this arrangement, everyone is in accord before the engineering is started.

When a production equipment design was submitted for approval and was not satisfactory, this design was given to department foremen who had charge of this particular design of equipment, with instructions to check the design and make recommendations and changes to meet the approval of the special machinery division. This design foreman was also expected to consult with the production department foreman for his criticism and approval. This close relationship with the production department eliminated many points of friction that often cause trouble and that the engineer is likely to overlook when



SINCE the material in this article is based largely on my experience at one of the largest automobile plants in the world, it might be interesting to outline first just how the machinery department is set up and how machinery was purchased from machine

tool manufacturers. This particular department originates all production tools, fixtures, dies, conveyors, furnaces, ovens, welding equipment, plant layout and outlines operations of the parts to be manufactured, also controlling the parts plants. There are no tool engineers, but there are foremen at

he is not in close touch with the job every day.

Points to Follow in Fixture Design

The most important part of a machine tool in at least 75 per cent of cases is the fixture, because the part that is to be manufactured can be machined only as accurately as the fixture is built.

There are 18 points that should be followed closely in approving a fixture design:

- 1—Location of part.
- 2—Plenty of clearance to load and unload the parts to be machined.
- 3—Clamping of parts so as not to distort and destroy the accuracy of part after it has been machined and removed from the fixture.
- 4—The clamping arrangement so designed that it will not distort the fixture when clamping the part.
- 5—Design to facilitate the changing of tools and perishable parts.
- 6—One of the most important points in the design of the fixture is to get rid of chips as rapidly as possible in such a way that it will not interfere with the cutting tools, being sure that the chips will not lie on the fixture, moving parts or hydraulic pipes. If not properly taken care of chips will cause a great deal of damage to the equipment, that is, to perishable and moving parts of the fixture. This chip problem should be given very serious consideration—but in a great many cases is neglected by machine tool builders.

Free Flow of Coolant

- 7.—When a coolant is used, it should be so arranged as to flow freely on the tools and at the same time be confined so that it will not spray all over the machine and operator.
- 8—Rigidity of design, to withstand abuse without affecting the accuracy of the fixture. It should be designed to radiate the maximum amount of heat caused by the cutting tools and revolving parts.
- 9—All perishable parts should be made of a good grade of alloy steel, heat-treated and ground.
- 10—All rest plates should be made to clean the surface of chips

and grit which may adhere to the parts as they are moved into position. This objective is attained by machining diagonal grooves across the rest plates and leaving the edges sharp so that when a part is moved over these plates the edges will scrape the surface clean.

- 11—The fixture should be designed to use standard commercial tools, or standard tools adopted by the customer, such as drills, reamers, spot-facers, milling cutters, taps, bushings, adjustable drill holders, or tap holders. Most designers believe that they must design a special perishable tool, and that it is impossible for them to use a commercial tool. In 99 cases out of 100 it is only the designer's imagination. I believe that if the manufacturer would check his perishable tool stock he would find in a great many cases that he has many tools that vary very little in size. If more thought were given to these tools a large percentage of them would be eliminated.

Hydraulic vs. Manual Operation

- 12—Whether a manually-operated or hydraulically-operated fixture is desirable depends on the production and size of the part to be machined. Where the part is small and on low production, manual operation is preferred. Where the part is large and heavy and the operator would have to handle an excessive amount of weight each day, then the fixture should be completely hydraulic. Where the operator has to handle a large amount of material, he becomes fatigued and loses his efficiency before the end of the day, so the gain in efficiency of the hydraulic over the manual fixture would soon pay for the difference in cost.
- 13—When designing a hydraulic fixture the oil passages should be completely manifolded. The manifold should be designed so that no hot chips will collect on it, causing excessive heat in the oil that may in some cases affect the accuracy of the fixture.
- 14—The clamping arrangement for a hydraulic fixture should be designed so that the releasing of the clamps is accomplished with a higher pressure than re-

quired for clamping. This is effected by using the piston rod end of cylinder for clamping. The hydraulic cylinder, in a great many applications, should operate a mechanical self-locking arrangement, especially where there is heavy-duty machining. This arrangement also keeps the side of the cylinder smaller.

Chips a Source of Trouble on Indexing Fixtures

- 15—The indexing type of fixture where multiple operations are performed are of three types: the trunnion, the rotary table and the conveyor. These fixtures cause more trouble than the single-purpose fixture. The chief sources of trouble are: the spacings between stations, the setting of tools so that each station will produce an interchangeable part, and chip disposal. Chips are one of the greatest sources of trouble on this type of fixture and their removal should be given very careful consideration. The coolant should be so arranged that it can wash away the chips.
- 16—The fixture proper should be a complete, independent assembly that can be located on the trunnion, rotary table or conveyor as a separate unit for each station. This design will make it possible to remove any one of these fixtures for repairs without affecting the operation of the machine.

Straight Locating Pin

- 17—The indexing mechanism, whether hydraulic or mechanical, will always have a tendency to lay or over-run its position. The locating pin should be straight with a bullet nose so that it will pull the fixture into its correct position and at the same time will clean itself of any dirt or chips which may adhere to the pin. A taper pin should never be used for locating, as it will not clean itself and any dirt or chips adhering to it will throw the location off.
- 18—The clamping arrangement, when clamping a rough casting or forging, should be designed so that the clamps can be re-tightened between each station while the fixture is indexing. When clamping on a finished surface this is not necessary.

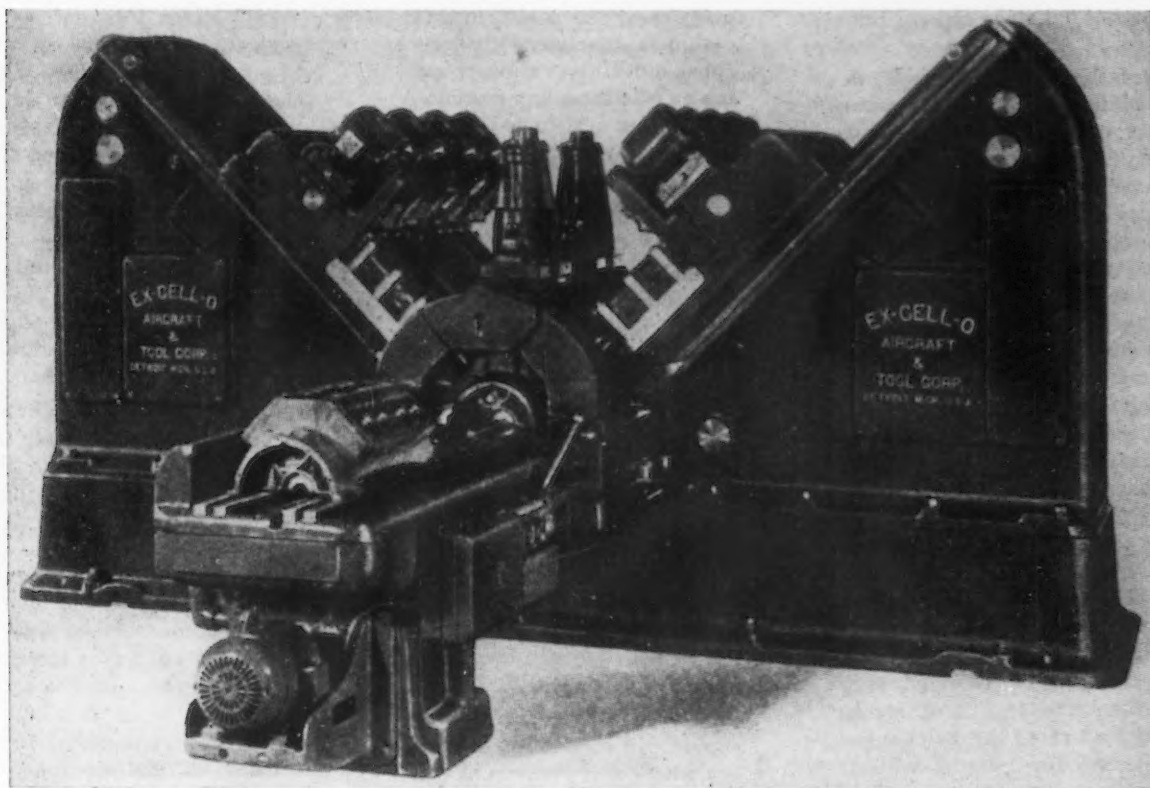
These points that I have outlined in approving fixture design hold true for any type of fixture, whether the fixture is for a single or multiple indexing or continuously operating machines.

Wider Use of Hydraulic Fixtures

The hydraulically-operated fixture is being used more every day

most cases and the different machine tool builders have developed over a number of years a standard machine for general purposes without any thought given to the necessary additional equipment, and in doing so, neglect to develop any engineers for this particular type of design. Yet there are very few standard lines of equipment sold

in producing a uniform wall thickness in the cylinder bore. This should be the place from which to locate, and the fixture should be designed so that it will equalize the variations in the distance between the two end cylinders and the crankcase. This principle holds true with pistons. They should be located on the inside diameter for



on all types of high production machinery where there are multiple operations to the cycle of the fixture. This type of fixture has proven very satisfactory for its simplicity in design, speed and uniformity of operation. Every part is located and clamped into position always with the same pressure, which is easily regulated. This point is essential where the part is frail and accuracy is required for the part machined.

A question may arise as to why all this precaution in approaching the fixture design when purchasing a machine and fixture from a machine tool company. Most machine tool builders will admit they do not know much about designing a fixture or there is not enough profit in so doing and that they prefer the customer to design and build his own fixture.

I believe this is understood in

IN this precision cylinder boring machine the fixture loads, locates and clamps the work automatically by hydraulic power. The complete machine cycle is automatic by hydraulic control, one lever. Rest rails are self-cleaning, and driving motors and controls are accessibly mounted.

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today that are not completely equipped.

What is the most important feature in the machining of any part? In my estimation it is the design of the fixture for the first operation. The fixture should be so designed that it will equalize the part and that the finish machined part will be as nearly uniform throughout in cross-section as possible, thus eliminating as far as possible any strains affecting the accuracy of any finished part. Take, for example, a cylinder block with multiple bores. Everyone is interested

the first operation to produce a uniform wall thickness.

Another example is the crankshaft. In a great many cases the crankshaft is not machined all over and the fixture should be designed to equalize the shaft from the part which is not machined. This procedure will minimize the amount of stock to be removed for balancing. These fixtures are sometimes very expensive to build, but where there is large production, it is money well spent.

Points In Designing Special Machines

I will outline 16 points of procedure that should be followed in designing or approving semi-special or special machines, which class of machine tools has been increasing every year. These points are:

- 1—Make the tool layout.
- 2—Select the type of tools to be

used—commercial or standard adopted by customer.

- 3—Figure the cutting speeds per minute and feed in thousandths per revolution, and make an experimental tryout.
- 4—Design the fixture around the part and the tool layout.
- 5—Determine the amount of travel necessary for machining the part and also the amount to remove tools and perishable parts of fixture in the minimum time.
- 6—In designing the machine, assemblies should be used wherever possible, especially where they are subject to excessive wear and have to be replaced quite often. By doing this there can be a spare assembly carried in stock. On way type machines where there are traveling slides, a hydraulic unit can be used to good advantage. Since it is a complete power unit in itself, the design provides for rapid advance feed and return and provision is also made for a dwell at the end of the feed. There are two types of these units manufactured today, the sliding type and the quill type. These are very economical to use and have a high salvage value. The spindle speeds can be changed very easily. The length of stroke and feed rates can be changed in a very few minutes without any cost by adjusting feed valve and dogs that operate and control the complete cycle. These units can also be mounted in any desired position and will drive a single tool or a multiple head when several operations are to be performed. They can also be used as prime movers or drivers for other machine units for milling, boring or similar operations.

Materials Should Be Checked

- 7—The selection of materials for the different parts of the machine should be checked very carefully as there is a tendency for the engineer to get into the habit of using one type of steel for all parts. The type of castings and steels should be selected and treated according to the wear and abuse to which the part is subjected.
- 8—The factor of safety should be at least four or five for ma-

chines in the automobile industries, where accuracy is of major importance and no vibration is tolerated. The machine should be designed for maximum rigidity and should be heavier than what is required for strength alone.

- 9—The oiling system of any machine should be checked very thoroughly while the engineering is in progress. In a great many cases this is left until the design is complete with subsequent difficulties in incorporating an efficient oiling system. A good oiling system is far more economical than a repair bill.

Ways and Spindles

- 10—When there are sliding heads or tables, to produce a precision job one way should be a V-type and the other a flat type and should be more than $2\frac{1}{2}$ times as long as the distance from the V to the center of the flat way. The slide should be heavy enough to absorb any vibration caused from the rotating parts or the machining operation performed. Where extreme accuracy is not required, two flat ways or two bars are sufficient for guiding any slides.
- 11—Spindle and spindle mountings should be very carefully designed. In production machinery where a machine runs continually 16 hr. or more a day the spindles should be designed for long life. There are three types of spindle mountings, namely, taper roller bearing; ball bearing; and plain bearing, either straight or tapered. The taper roller bearing should be used for heavy-duty spindles, the ball bearing for drill spindles or lighter operation and also for precision work. The plain bearing is probably the most accurate bearing of these three, but it does not have the life and generates more heat and causes more trouble than the anti-friction bearings.

Anti-Friction Bearing Reduction Gears

- 12—Where any degree of accuracy is required, high grade castings should be used for the bases and housing of various machines. A great many machines are built today of welded

steel. This is very economical when only one machine is being built and probably will not be duplicated or where close accuracy is not required.

- 13—The reduction gears on all machines should be mounted on anti-friction bearings. They should be designed to the accepted rule for the required horsepower, but in practice the width of the face of the gear should be at least twice that theoretically required, in order to provide a longer life. Where the speed of the gear is not very high, the oiling system can be of the submerged type. On very high speed gears a circulating system is provided so that the high speed gears will not churn the oil and create a tremendous amount of heat and ultimate failure.

Motors and Controls

- 14—All motors should be mounted in an accessible place for ease of maintenance and not mounted within the housing of the machine as they are likely to overheat. The electrical control equipment should be standard as such equipment not only provides economies on new installations but saves time and money when maintaining equipment that is in service. It should not be mounted in the housing of the machine but outside in a separate control box. Mounted in the housing of a machine, it is subjected to dirt, chips, heat and oil leakage which will tend to cause short circuits and probably result in a great deal of damage.
- 15—The pump and necessary operating equipment for hydraulically operated machines should be mounted in a self-contained unit including the motor mountings and oil reservoir. Most units are designed so that air can circulate completely around the unit with the result that little heat is transmitted to the machine proper. The oil passages should be manifolded wherever possible to eliminate leaks. A minimum amount of space is required if properly designed. Hydraulic operating valves should be mounted on the machine where they are easily accessible for repairs.
- 16—As previously mentioned, the

machine should be designed in units whenever possible. This is generally practical on way, vertical indexing and vertical turning machines. In the majority of cases the self-contained hydraulic unit can be used to good advantage.

Electric-Hydraulically Operated Machine Tools

The most recent development in machine tool design is the electric-hydraulically operated machine. On this type of installation the solenoid-operated hydraulic valve is used. It controls the different functions of the machine through limit switches and a rotary electrical indexing switch. The limit switch operates the indexing switch which in turn operates the solenoid hydraulic valve. The electrical equipment interlocks so that each function of the cycle of the machine must be completed before the switch

will index for the next operation. This type of arrangement is fool-proof. If any part should fail the machine will stop automatically and cannot go to the next operation of the cycle until the trouble is found and repaired.

On a machine of this type that has just been finished for an automobile manufacturer there are 15 operations to complete the cycle of the machine. All that is required of the operator is to push the starting switch and the machine will go through its 15 different operations automatically in 48 sec.

When to Replace Equipment

When should semi-special, special or improved equipment be purchased? A manufacturer cannot afford to delay purchasing this equipment if it will pay for itself within the year. In figuring the saving one should take into consideration the man-power saved, the

amount it would cost to keep present machines in repair and the savings in tools over the old method. I have seen cases where the saving in tools alone would easily justify the purchase of new equipment.

There are instances where only the quality of production is taken into consideration when a machine is purchased, but sometimes a saving is shown in a following operation. For example, some machines were bought for precision boring of cylinder blocks. A tool saving of 5c. per block over the old method was made, but the saving did not stop there. The improved method reduced the honing operation to a minimum, produced a bore that was round and straight and it eliminated the number of different sizes of pistons, with less trouble in the final assembly. In fact, there are hundreds of cases where new equipment not only has shown a saving in labor and tools, but also has produced a much superior product.



Advisability of Training

By H. D. SAYRE

Commissioner, National Metal Trades Association, Chicago.

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THE advisability of training men to overcome either present or potential shortages of skilled workmen will not be questioned by experienced plant managers, but the kind and extent of training to be provided and the methods to be employed are elements which must be carefully considered, determined and provided for if satisfactory results are to be achieved. Although our plant managers have experienced some difficulty in obtaining services of skilled men in certain fields, I doubt whether many of them realize how serious the present and potential shortages are and the best methods of overcoming such shortages.

Perhaps the best way to deal with this problem is to outline ways and means which may be used to determine the extent of the problem and then suggest methods of training which may be used in developing specialists or machine tool operators, apprentices, journeymen, and foremen.

Survey Plant Needs

A survey of plant needs will disclose, in many cases, an acute need for training a number of young men as special machine tool operators or operators on special types of bench and assembly service, and also a number of boys to become machinists, toolmakers, and die-sinkers. Such a survey should determine, among other facts, the number and kinds of skilled employees needed for present and

near-future needs. After the kinds and numbers of needed skilled employees are known, the present personnel should be examined to learn what kind of work each employee can do most effectively. In the study of employed skilled personnel, if you find an unusual number of men whose productivity, because of advancing age or physical impairment, suggests early application of superannuation devices, you should determine probable adjustments to learn your replacement needs. A summation of these factors will disclose the extent of your training problems.

The type of training which can be utilized immediately and very effectively is the training of machine or special process operators which some companies have been unable to obtain easily in the competitive market.

Places for Intelligent But Inexperienced Applicants

Most industrial plants have a large number of high grade intelligent men applying for employment, who have not been trained on industrial processes. However, employers can induct a number of these applicants into their plants and quickly develop them into satisfactory producers. Practically any of these inexperienced applicants, under proper instruction, can be quickly taught to operate many of your machine tools, such as drills, milling machines, screw machines, lathes, etc., where the processing is either very simple, or rough work, or where operations and accuracy are controlled very largely by the use of jigs and fixtures.

In order to induct these men into this type of employment, employers should carefully examine the pos-



to Overcome Labor Shortage

sibility of promoting men now employed as specialists in a particular field to some other type of operation requiring a little more training and a higher degree of skill, such as moving an operator from work where the accuracy is completely controlled by jigs and fixtures to operations which are only partially controlled or totally uncontrolled by jigs and fixtures. In some cases it would not be very difficult to transfer one of these men to some other type of machine where there is less use of controlling devices. In many cases an operator employed on a given class of service, by observation of men employed on other types of machines or processes, has learned how such machines or processes are controlled which enables management to transfer such men and with a very limited amount of additional training make them proficient in the operation of other types of machines or processes. Such a promotional plan in an organization could be effectively carried out from the lowest to the highest and most difficult types of processing.

Concealment of facts during the employment process sometimes misleads foremen into believing specialists do not require special instructions. Although specialists may have operated similar machines on similar processes, their limited training and experience suggest the desirability of giving them thorough instruction when they enter your employment, whenever a process is changed or when different devices are introduced with which they may not be familiar.

In order to put the promotional plan into effective practice, either foremen or competent instructors will have to be held responsible for the instruction of new men and

those being transferred to other jobs. Whenever a foreman is unable to instruct men, either because of the number of men he is required to supervise, or because he lacks the ability to properly instruct, competent instructors should be used for this type of service to make certain that anticipated results will be accomplished.

Operators Provided by Promotional Plan

We believe that this type of promotion from jobs requiring limited skill to others requiring more skill, which may be developed by training, will supply many of the specialists now required in the production field. Promotion of your employees will provide an incentive to do their best work as a means of more fully developing themselves on different types of work. Further, such a plan of promotion and training, if effectively used, would develop a more skilled, mobile working force that would be eager to cooperate with management because of management's demonstrated interest in their further development.

The methods and materials to be used in training these operators are the same as those used in training apprentices.

In the field of apprentice training we have developed a distinctive and complete service which can be utilized by your companies. This service includes a survey of plant policies, practices, equipment, and personnel, which is supplemented by detailed plans for the guidance of management in training apprentices. Managers have often been surprised, at the completion of a survey, to learn that their policies on training were not as complete as they might have been, that practices, in many cases, were far from

INTELLIGENT but untrained men can be quickly taught to operate machine tools where the processing is simple and accuracy is controlled by jigs or fixtures. Specialists thus replaced can then be trained for operations requiring greater skill.



desirable, and that inadequate numbers were being trained. After the survey has been completed and evaluated, managers have been better equipped to develop plant policies and practices which enable the manager and his subordinates to effectively direct the training of apprentices.

Outline of Training Policies Furnished

In our service to a member, after we have completed a survey of the conditions in his plant, we provide an outline covering policies and practices to be used in the promotion of their training program. This report outlines courses of instruction indicating time allotted to the instruction of apprentices in the use of trade practices followed in the plant, and in the study of the related subjects, such as mathematics, science, drawing, economics, and English. These outlines indicate the type of subject matter to be taught and the texts recommended for use.

We supply, at cost, instructional material entitled "Machine Shop Technology" for use in training the apprentices on shop practices to assure thorough instruction. This material provides very complete detailed directions for operating machines on different types of jobs, including set-up of machines and all other instruction necessary to the completion of the job. The subject matter of our "Machine Shop Technology" including terminology, illustrations and applicable mathematics or science, was developed by a staff of specialists and then revised by more than a hundred industrial executives before publishing. The text provides the type of information and instruction that very satisfactorily supplements foreman instruction and serves as a means of eliminating the possibility of the foreman overlooking necessary instruction.

The standard texts recommended for use in teaching the related subjects are those used by accredited public schools. The cost of the entire set of texts, including our "Machine Shop Technology" and all related subjects needed and recommended for teaching machine shop apprentices, does not exceed \$20 per pupil.

Training of Apprentices

The training of apprentices on shop processes in most plants

should be delegated to the foreman or to competent instructors who move about the shop giving the boys instruction on the machine or processing at the usual location of such machines or processing. The instruction should assure correct use of basic principles, motions, and modern methods in the control of tools and processes based on the best standards of performance to obtain maximum production with a minimum expenditure of energy. Proper instruction of these learners as prescribed by our plan will produce better workmen than most of the journeymen now employed.

The suggestion that better journeymen can be produced indicates possible improvement of journeymen now in your employ which would relieve the skilled labor shortage somewhat.

Instruction of Journeymen

Improvement of journeyman performance depends upon further instruction of these workmen. The instruction of journeymen by foremen has been almost totally neglected because of several factors: (1) foremen erroneously assumed that journeymen had been properly trained and would not require further instruction; (2) the foremen's admitted lack of ability to properly impart instruction in certain phases of the work they supervise caused them to avoid this responsibility; and (3) the foremen, in many cases, have been reluctant to attempt instruction of a journeyman whom they believed might resent such activity on the part of the foremen, etc. It should be fair to assume that either the foreman, or someone else in industry, would be delegated the responsibility of properly instructing even journeymen workmen. It is unfair for any official to accept the conclusion *a priori* that a journeyman has been properly trained and will function properly on every operation. Even though some of these men were fairly well trained in the beginning, some of them have adopted methods of working and developed habits, including the use of wrong motions and methods, which are positively detrimental to themselves and others around them. Further, if the foreman thinks or knows that he is not properly qualified to instruct men, he should start learning how to do it because it is one of the most essential parts of any foreman's job. Finally,

foremen should never hesitate nor avoid giving any journeyman proper instruction. I have purposely stressed the instruction of journeymen because many managers and foremen have overlooked a real opportunity to do effective work in this field. Further, we believe that correction of journeyman practice will have a salutary effect on the thinking and actions of other workmen.

Correct Teaching Methods by Foremen

Since this entire problem is based on instruction, the first step in the program should be a more thorough training of foremen in an appreciation and understanding of and an ability to use correct teaching methods in an approved manner. Some foremen because of natural aptitude have acquired a limited ability to instruct others in the use of tools or processes, but there are very few foremen who understand the teaching process and are able to use it intelligently. In many cases they do not properly understand learning difficulty, selection and organization of subject matter, preparation and presentation, nor the methods of testing performance except within certain limited fields. Management's failure to properly train foremen in the effective use of the teaching process has handicapped their workmen more than most managers believe. Correct instruction, properly used, will eliminate spoiled work and increase production of high quality material which will help relieve your labor shortage.

The National Metal Trades Association for a number of years has advised employers to make effective use of our methods and materials in training their foremen. Among many of the purposes underlying this training is the development of foremen's abilities to properly analyze their work and to more effectively discharge their responsibilities in all fields and particularly in the training of their employees. The instructional material we use for training foremen covers all of the major responsibilities of foremen and helps them develop means and methods of dealing with their problems that invariably produce surprising results. The best and most desirable results accruing to a plant from foreman training are those based on the instruction of workmen by their foremen. In-

struction of employees will always be most successful when foremen are capable instructors even though others may be responsible for such work.

Not To Be Accomplished Over Night

The educational procedure, which has been suggested for the training of specialists, apprentices, journeymen and foremen, cannot be accomplished over night, but from the long range viewpoint, it is the only effective means of developing a suitable supply of skilled employees.

Finally, in order to develop a plant training program in the most satisfactory manner, the following conclusions can be accepted and used by management:

- 1—Policies should be developed by management for management - employee guidance which indicate the services to be ren-

dered, which are thoroughly understood by all—officials, supervisory force, and employees.

- 2—A management attitude toward training should develop and foster cooperation between management and every employee that will help each man develop to his utmost.
- 3—Management should demonstrate in its daily work a sincere desire to fully develop a working program.

The above suggestions regarding policies and plans should be based on the following:

- 1—Actual conditions in the plant.
- 2—Experience of the plant compared with the experience of other plants.
- 3—The entire program should be designed to develop a higher degree of

industrial cooperation in the promotion of training.

- 4—They should introduce and encourage more extensive use of proper training of all employees.
- 5—Management should use the methods most readily adapted to its own plant conditions and personnel needs.

The extension of plant training programs to include a more extensive and effective use of the suggestions presented for your consideration should develop the kind of cooperation that would result in providing a sufficient number of well trained, highly skilled workmen, to meet industry's needs. In addition to the measurable improvement in productive capacity, such a program would contribute immeasurably to the development of the broader field of industrial relations which is of vital interest to every plant manager.



How Arc Welding Cuts

PART I. — Advantages of Arc Weld Fabrication

THE second and third parts of this article by Mr. Davis, to be published in forthcoming issues of *THE IRON AGE*, will be devoted to typical tooling savings and to simplified tooling procedure respectively.

o o o



MASS production sprang from the toolroom. The science of tool engineering has made possible high manufacturing speeds and low production costs by the development of ingenious jigs and fixtures. By freeing manufacturers from the necessity of laying-out and machining each part individually, such jigs and fixtures have taken countless products out of the luxury class.

Tooling, today, involves more than simply the production of jigs and fixtures. Such equipment must be produced quickly and at minimum cost. In design, it must lend itself to quick changes to accommodate refinements or improvements in product. Yet speed and economy must be obtained in tooling without sacrifice of strength or accuracy.

Manufacturers have found electric welding a fast and economical method of making jigs and fixtures. The strength and rigidity of arc welded steel construction, the simplicity and directness of the electric arc's application, its versatility and flexibility, plus inherent economy—these advantages of electric welding explain why it

is being increasingly employed in production plant tooling operations.

High quality welds are especially desirable in jigs and fixtures, for such equipment must be strong and rigid, able to resist working strains and retain original dimensions in every application.

In the building of jigs and fixtures, the manufacturer is easily able to produce high quality welds by today's well developed shielded arc process of electric welding. This process has improved the construction of thousands of metal products and structures and at the same time has lowered their production costs.

The toolroom experiences numerous advantages by using arc welding in the production of jigs and fixtures. Tooling-up with the arc is an operation which the manufacturer can do entirely within his own plant, with his own workmen and his own equipment. Each step of the work, from design to completion, can be done by the tool department. Whether the requirement is for

a small jig or fixture of few component parts and for a simple service, or a large complicated unit, composed of many parts, for a highly involved application—the jig or fixture can be made to rigid specifications with simplicity and speed.

Here are more concrete advantages of arc welded jigs and fixtures:

The strength and rigidity

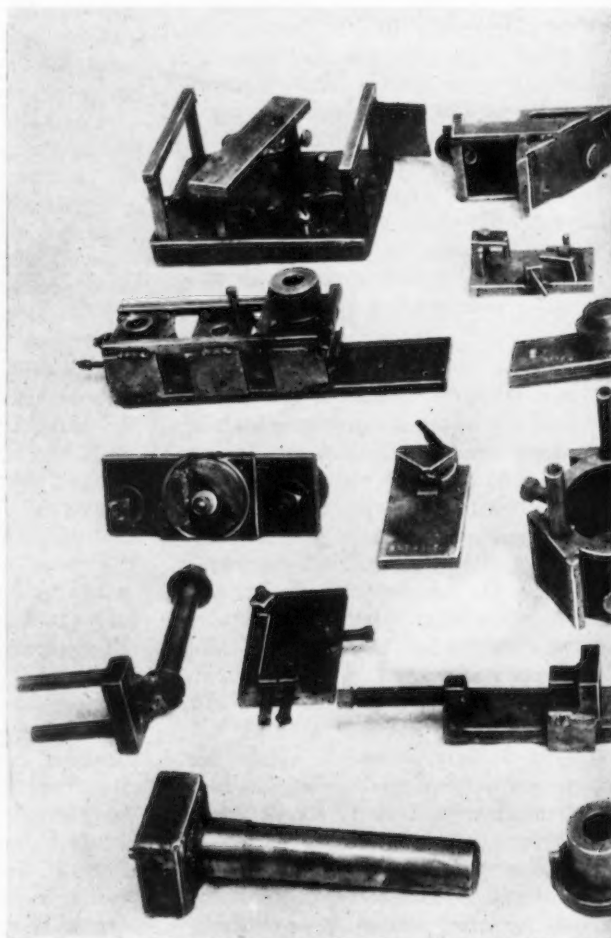


Fig. 1—Typical examples of small

Costs of Jigs and Fixtures

By A. F. DAVIS

Vice-President, Lincoln Electric Co.,
Cleveland

of mild rolled steel is provided throughout the structure.

Accuracy is obtained because parts are placed and welded to close tolerances.

Savings in cost up to 50 per cent are reported.

Construction time of jigs and fixtures is reduced up to 85 per cent.

Weight is reduced 10 to 50

per cent. Extra weight, when wanted, is welded quickly in place.

Application of arc welding is limited only by the ingenuity of the tool designer and ability of the arc welding operator.

Jobs which formerly were too costly are easily done. All sizes and shapes of materials are joined readily.

A wide variety of jigs and fixtures can be made with arc welding. This advantage applies particularly on short runs.

Arc welded construction requires a minimum of machining. Metal is placed exactly where needed.

All equipment is maintained economically by arc welding; changes or repairs are quickly and easily made.

The foregoing advantages of arc welding made it possible to make the jigs and fixtures shown in Fig. 1. Were it not for the simplicity and ease of assembling

standard prefabricated parts by arc welding, many of the units shown would not have been made.

Many Industries Tool-Up with Arc Welding

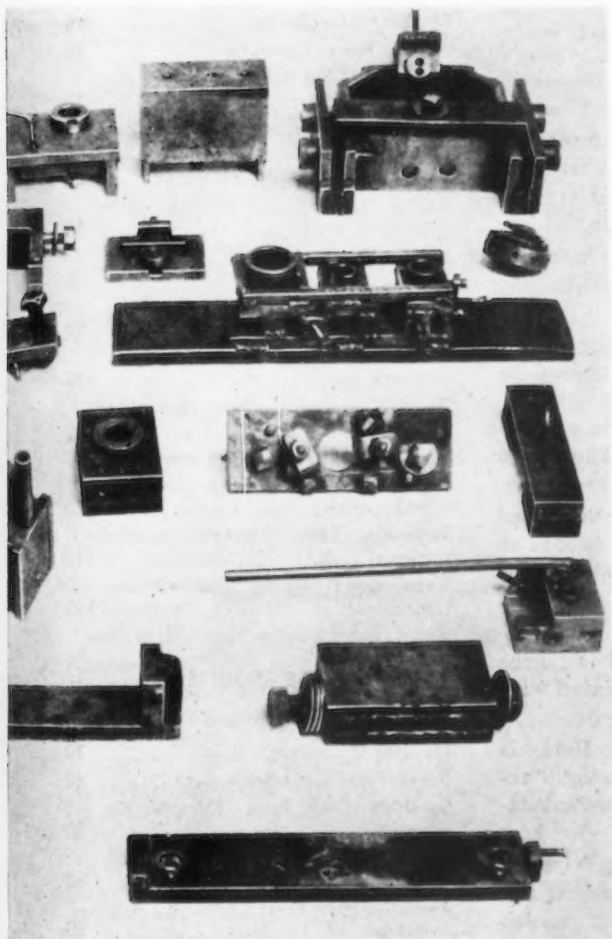
Because of the economies and improvements made possible by arc welding in production tooling, many industries tool-up with the electric arc.

The automobile industry is the largest user of arc welded steel jigs and fixtures. Such equipment is used in production of car engines, transmissions, wheels, axles, frames, cowl, differentials, hood covers, and bodies. Many of the welded jigs and fixtures are highly complicated in design and are built to exceedingly close tolerances for drilling, reaming, tapping, boring, shaping, assembling, etc.

Automobile builders save many thousands of dollars with welding. They easily and quickly alter production equipment to suit changes in body and parts design. With the arc, steel fixtures can be cut, altered and reassembled without any sacrifice of strength or accuracy. With old-time tooling methods, once a jig or fixture became obsolete it was replaced.

Other users of welded steel jigs and fixtures include manufacturers of the following products: Concrete machinery, conveying equipment, cranes, earth moving equipment, electric motors, furnaces and boilers, industrial trucks, machinery of all sorts, metal furniture, mining equipment, pipe, pumps, railroad equipment, rubber products, safes and vaults, sheet metal products, ships and barges, steel barrels, steel cabinets, steel drums, steel mill equipment, structural steel, tanks, and trucks.

(To be continued)



arc welded steel jigs and fixtures.

Applying the Point Method of



IS the point method of rating or evaluating jobs complicated and impracticable?

This very reasonable question can be best answered by seeing the plan in actual operation.

As stated in the previous article (*THE IRON AGE* of Sept. 10), it is my opinion that the most logical manner of applying a job evaluation of this sort is from master scales of standard representative jobs which can be drawn up for each measured element. These jobs will serve to interpret the range of point value, from minimum to maximum for each factor.

Space limitations preclude the giving of very complete rating scales, but it is hoped that, through more general and condensed than most desirable for actual use, those here given will serve to make application of the method clear.

The factors measured are of such a basic and general nature that they may be used in rating jobs in any industry or business, although the examples given are particularly applicable to metal manufacturing.

In the previous article the factors selected as determining wage differentials were: 1.—Skill; 2.—Responsibility; and 3.—Working Conditions. Sub-classifications of skill were given as: Intelligence; knowledge required; manual skill; and learning time. Sub-classifications of working conditions are: Application, physical and nervous; and occupational working conditions.

A brief interpretation of these factors is as follows:

Intelligence: Measures the degree of these inherent mental qualities of reason, analysis, etc., that are required for satisfactory performance of the job.

THEORY and advantages of the point method of setting up and justifying rate differentials were discussed by Mr. Bass in *THE IRON AGE* of Sept. 10, page 42. Although necessarily condensed because of space limitations, the applications outlined herewith should be helpful in establishing similar rating scales in other manufacturing plants.

Knowledge: Here is measured the amount of knowledge, whether of academic, general or of specific nature that is needed to do the job.

Manual Skill: This is a measure of the degree of motor skills that must be developed.

Learning Time: Primarily a measure of the experience needed to develop a proper perspective of the job, and secondarily, it is a more objective measure of knowledge and manual skill.

Responsibility: Here is measured the degree of carefulness needed as indicated by the magnitude of loss which could result to material, equipment or tools.

Physical Application: The degree of physical fatigue associated with the performance of the job.

Nervous Application: Here is measured the nervous fatigue resulting from close or constant attention.

Occupational Working Conditions: This is a measure of the degree of undesirability of a job as conditioned by hazards, heat, eye strain and the like.

The sample rating scales that follow cover only the more common class of jobs. It is necessary, of course, that the jobs with which comparisons are being made are known as thoroughly as the ones being rated. Although the job descriptions here given are brief and not completely adequate, they will give approximate accuracy in evaluating others.

RATING SCALES

I. INTELLIGENCE POINTS

Laborer	10
Material Handler	15
Punch Press Operator.....	25
Chipper (Chip apparatus for appearance)	35
Cold Saw Operator (Select and cut material)	45
Painter (Paint finished apparatus) ..	55
Radial Drill Press (Rough drill flanges, etc.)	65
Hand Screw Machine (Standard studs and bolts)	75
12 In. Cyl. Grinder (Small shafts and bushings)	90
4-5 Ft. Planer (Miscellaneous accurate work)	105
24 In. Engine Lathe (Accurate threads and tapers)	125
Repairman (Repair large cranes) ..	150
Electrician (Wire complex circuits and panels)	180
Toolmaker (Best jigs and master gages)	210
Repairman (Diagnose trouble in any machine)	250

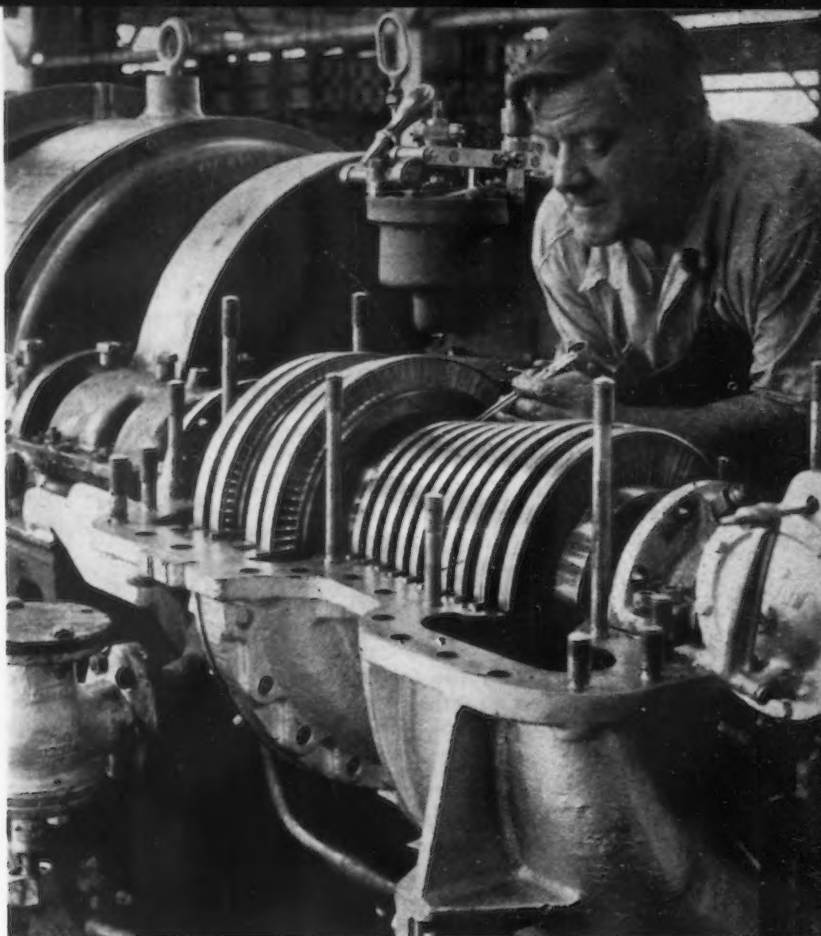
2. KNOWLEDGE REQUIRED

Laborer	20
Elevator Operator	30
Punch Press Operator	40
Sensitive Drill Press (Simple jig work)	50
Annealer (Oper. small annealing furnace)	65
Radial Drill Press (Rough drill flanges, etc.)	80
Hand Screw Machine (Standard studs and bolts).....	95

Evaluating Jobs

By A. W. BASS, JR.

Industrial Engineer, South Philadelphia Works, Westinghouse Electric & Mfg. Co.



Cylindrical Grinder (Small shafts and bushings)	115
Oxy-acetylene Welder (Various materials)	130
4-5 Ft. Planer (Miscellaneous accurate work)	150
24 In. Engine Lathe (Accurate threads and tapers)	175
Pipe Fitter (Complex bending of 4-6 in. pipe)	200
Roll Turner (Develop and turn rolls for mill)	230
Gear Hobber (Calculate helix angles, gear trains, etc.)	265
Garage Mechanic (Repair all company cars)	305
Repairman (Repair all machine tools)	350

3. MANUAL SKILL

Punch Press Operator	5
Hand Screw Machine (Studs, bolts, etc.)	10
Cylindrical Grinder (Small shafts and bushings)	15
24 In. Engine Lathe (Accurate threads and tapers)	20
Plasterer (Finished interior work) ..	30
Craneman (50 ton)	40
Oxy-acetylene Welder	55
Toolmaker (Finish master gages) ..	75

4. LEARNING TIME

Janitor	1 month	15
Punch Press Operator ..	2 months	30
Sensitive Drill Press (Simple jig work) ..	3 months	45
Radial Drill Press (Rough drill flanges, etc.)	6 months	75

Hand Screw Machine (Studs and bolts) ..	9 months	100
Craneman (5 ton)	1 year	125
Painter (All apparatus) ..	1 1/2 years	170
4-5 Ft. Planer (Miscellaneous accurate work)	2 years	205
24 In. Engine Lathe (Accurate threads and tapers)	3 years	265
Blacksmith (Tool forger)	4 years	310
Pipe Fitter (Bend 4-5 in. pipe)	5 years	350
14-16 Ft. Planer (All work)	6 years	385
Toolmaker (First class work)	8 years	445
Repairman (Repair all machine tools)	10 years	500

5. RESPONSIBILITY

Chipper (Chip and clean castings) ..	6
Sensitive Drill Press (Simple jig work)	9
Hand Screw Machine (Studs and bolts)	12
24 In. Engine Lathe (Miscellaneous accurate work)	16
Milling Machine (Accurate work with form cutters)	24
Repairman (Repair all machine tools)	35
Hot Roller (Operate small hot mill) ..	45
Craneman (Cranes under 30 tons) ..	55
10 Ft. Planer (All work)	70

Craneman (Cranes 50 tons and over)	85
--	----

6. PHYSICAL APPLICATION

Craneman	5
Cylindrical Grinder Operator	10
24 In. Engine Lathe Operator	15
8-10 Ft. Planer	20
Patternmaker (Large work)	30
Pipe Fitter (Bending 4-6 in. pipe) ..	40
Carpenter (Skid, load, and block large apparatus)	50
Drop Forger (5000 lb hammer)	65
Coal Handler (Power House)	80

7. NERVOUS APPLICATION

Cold Saw Operator	5
16 Ft. Planer	10
Radial Drill Press (Rough drill flanges)	15
Cylindrical Grinder (Small shafts and bushings)	25
Drop Forger (5000 lb. hammer) ..	35
Punch Press Operator	45
Toolmaker (Master gages)	55
Arc Welder	75

8. OCCUPATIONAL WORKING CONDITIONS

24 In. Engine Lathe	10
Craneman (50 ton)	15
5 Ft. Radial Drill Press	20
Punch Press Operator	25

Painter (Paint finished apparatus)	30
Annealer (Load and fire large furnaces)	40
Chauffeur (Operate company trucks)	55
Hot Roller (Operate hot mill)	80

When enlarged master rating scales of this nature have been drawn up for the industry involved, the evaluation of any new or existing job is accomplished by selecting a point value under each factor which appears to represent the proper position of that job in relation to the job's set-up in the rating scales for comparison. The total of the points selected in this manner, under each factor, gives an arithmetical value for that job in relation to all other jobs that have been or ever will be rated from the same scale.

It should be borne in mind, however, that this is a value of relation only, and does not represent any absolute rate. The question of applying these points to a wage scale should be an entirely separate consideration from that of making the original evaluation.

In other words, the ultimate result of job evaluation should be the existence of an abstract point value for every job, which value would reflect nothing more than a mutual relative relationship. When this objective has been achieved, the problem of job evaluation has been completed. Barring changes in the job, or conditions surrounding it, this value should remain fixed.

Relating Points Values to the Wage Scale

In relating these point values to the wage scale, it is desirable to justify as many existing rates of

Table 1

Points	Rate
115	\$0.45
210	0.50
305	0.55
400	0.60
495	0.65
590	0.70
685	0.75
780	0.80
875	0.85
970	0.90
1065	0.95
1160	1.00

pay as possible. To do this, the point values derived for the various jobs should be plotted on regular coordinate paper against existing wages. The "Curve of Least Squares" drawn through these points will most nearly satisfy the original wage structure.

There is no sacrifice in flexibility by doing this, for it is still possible to make changes in the wage scale without invalidating any of the established point relationships. A flat increase or decrease, an increase for labor which will gradually diminish up the scale, or an increase for the highly skilled trades which will gradually diminish down the scale, any of these can be effected merely by changing the shape or slope of the original "Curve of Least Squares."

Examples of Application

For the purpose of illustration, Table 1 gives the corresponding points when referred to a hypothetical wage scale having a minimum of 45c. and maximum of \$1.00.

By using considerable interpolation, it is possible to secure an approximate point value from the abbreviated rating scales given here. This value, when referred to the wage scale adopted for illustrative purposes, will indicate the hourly rate that job should be paid within this particular range of hourly rates.

In Table 2 is a group of jobs which were evaluated by comparison with the rating scales. The weighting of each factor is given, together with the total point value for the job and the hourly rate this would receive if applied to the wage scale in Table 1.

The exact relative position or importance of any job under a given factor will never receive unanimous agreement, for every individual's appraisal will be affected by his own perspective and experience. Therefore, while the examples given in this article might indicate that the objective was to determine one inflexible rate for the job, I personally feel it is more desirable to establish small rate ranges for every job.

In other words, to divide the wage scale into certain classifications and use job evaluation to determine into which class the job should fall. This establishes a larger target at which to shoot in making the evaluation, and consequently minimizes the dissatisfaction that might be expressed by labor over disagreements of a cent or two in appraising the different factors of the job. It also creates a slight rate differential on each job which can be used to differentiate to some degree among varying degrees of individual ability on similar jobs.

TABLE No. 2

	Chipper	3 ft. Radial Drill	Crane Operator	24 in. Engine Lathe	Milling Machine
	(Trim castings)	(Drill flanges, etc. to jig)	(50 ton bridge)	(Accurate threads and tapers)	(Differential toolroom milling)
1. Mental Requirements	35	65	65	125	150
2. Knowledge	50	80	65	175	200
3. Manual Skill	15	5	40	20	20
4. Learning Time	4 months — 55	6 months — 75	1 year — 125	3 years — 265	4 years — 310
5. Responsibility	6	16	85	16	24
6. Physical Application	65	15	5	15	15
7. Nervous	25	15	15	25	25
8. Working Conditions	40	15	15	10	10
Total Points	291	286	415	651	754
Corresponding hourly rate	\$0.54	\$0.54	\$0.61	\$0.73	\$0.78

Pontiac Factory Busy after Four Year Shutdown

° ° °

By FRANK J. OLIVER
Detroit Editor, The Iron Age

° ° °



SHORTLY after the first of the year Pontiac Motor Co. reopened its foundry which had been idle since 1932. The \$500,000 reconstruction program started last summer is nearing completion with the result that the foundry is working at close to capacity at the present time. When the foundry goes into full operation, from 350 to 400 tons a day will be normal production.

Six production lines are functioning now. They are the 8-cylinder motor block line; 6- and 8-cylinder head line; flywheel line; clutch housing line; manifold line and small parts line. Additional retooling and equipment will provide for a 6-cylinder block casting line. Also a new line will be opened up to handle pistons for both sixes and eights.

Following its customary practice of recruiting all employees locally, Pontiac was faced with the problem of taking such inexperienced workers as the local market offered and training them or going outside of the city of Pontiac for more experienced help. The former

course was pursued. Although 85 per cent of the core room employees and 60 per cent of the foundry men were inexperienced when they were hired, they were trained during the early stages of production on the small parts line.

When the foundry began operations, three foremen were brought in from the outside and with the small number of experienced foundry workers available in Pontiac, the training program began. These experienced people acted as instructors on the small parts line, which was the only line in operation. It was set up first for this training course because its cores, molds and castings are more simple and easier to handle.

As fast as new employees developed exceptional ability, they were put on the floor as crew leaders to instruct other new employees. When each new line came into operation, part of the trained people were taken from the small parts line and put with inexperienced people on the new line. Their places in the small parts line were filled with other inexperienced workers.

This policy has worked out especially well, it is stated by Pontiac production heads, and on April 15, after three months of operation, scrap losses due to defects showing up in the foundry and in the machine shop were down to 4 per cent, a record which would satisfy most any old established foundry.

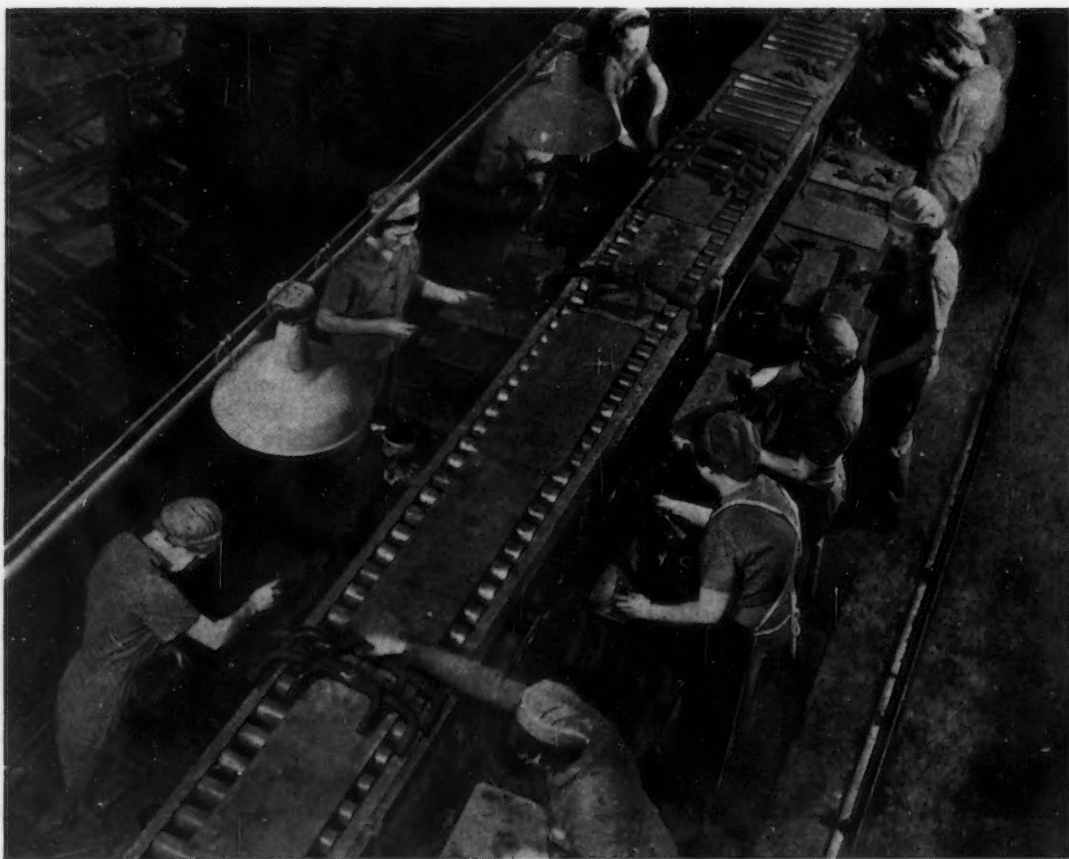
Generally speaking, standard foundry practice is used throughout the plant. One departure is the method of making up and weighing the cupola charge. Regulation dump-bottom buckets are employed. Buckets are placed on the platform scales of weighing cars which are propelled back and forth on rails between rows of bins containing the ingredients of the mix. All weights and names of ingredients in each mix are printed on a tape in the scale which is under lock and key. Weights are checked up at night. The advantages of this method of making up the mix are accuracy in controlling amounts of ingredients and economy of handling.

Buckets are picked up from the
(CONTINUED ON PAGE 100)

PONTIAC FACTORY BUSY AFTER



• • •
SPECIAL gages are used in assembling the cylinder barrel and crankcase cores in this 8-cylinder Pontiac engine mold.
 • • •



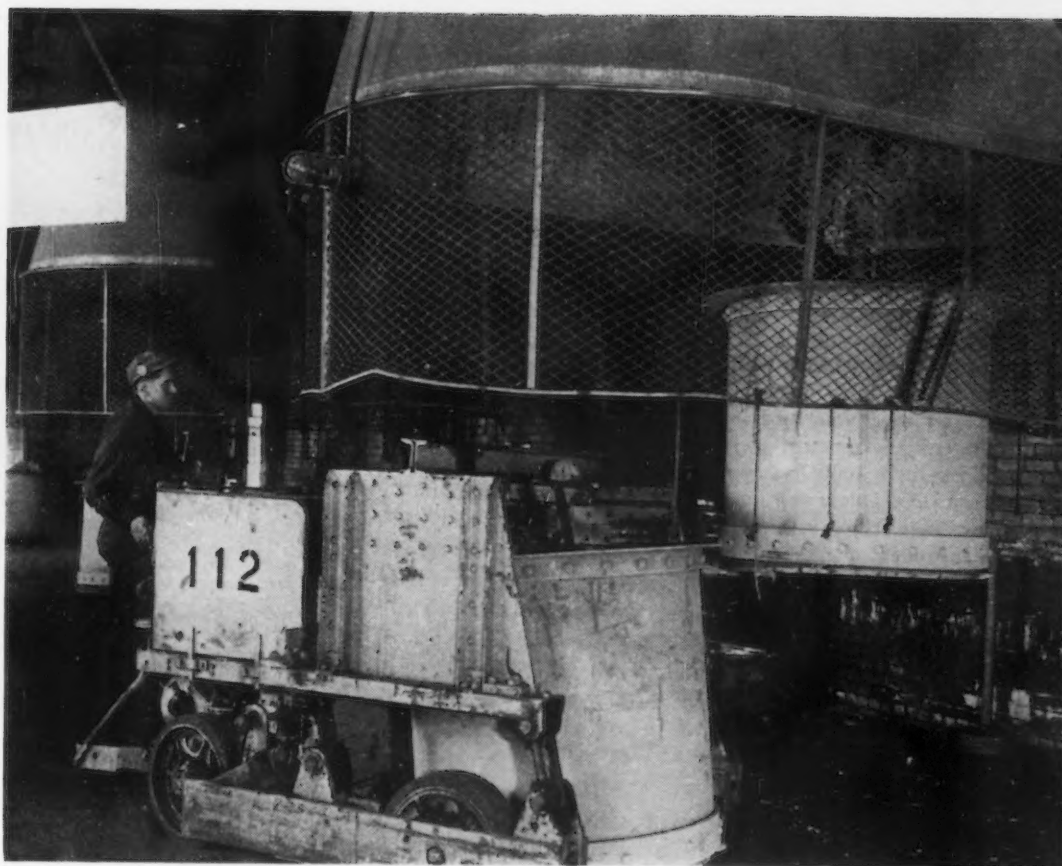
• • •
MUCH of the work in the core room at the Pontiac foundry is performed by women. This view shows manifold cores being finished and placed on a conveyor.
 • • •

FOUR YEAR SHUTDOWN

PREPARING the cupola charge in the remodeled Pontiac foundry. Standard charging buckets are loaded on the platform scale of a weighing car which is propelled on rails between rows of material bins. Each ingredient is weighed separately and the amount is printed on a tape in the scale. Machine boring briquettes and cylinder block scrap are shown being added in this picture.



A SPECIAL industrial truck takes charging buckets from the scale car to the bottom of the cupola hoist. Bucket loads run up to one ton.





Bonneville Sets Pacific Coast

III - Miscellaneous Mineral Resources

THIS is the third and last articles in the series in which Mr. Hodge outlines the economic and technical factors which point to the establishment of ferro-electric smelting, at reasonable cost, on the Pacific Coast.

The author was in charge of the elaborate survey on this subject made for the Government as a step toward uncovering practical ways to consume the large quantities of electric power that will soon be available because of Bonneville Dam and other projects.

Limestone. The iron ores recommended in the report are high in lime and magnesia. The Wilkeson coke is rich in fluxing ingredients. The limestone of the Pacific Coast is exceptionally low in silica and alumina and magnesia and for all these reasons the amount required will be less than 1000 lbs. per ton of pig iron, and below the national average. Also the uniformity of size and absence of fines need not be strictly adhered to in an electric furnace. Hence the cost of limestone flux should be low.

Limestone of satisfactory quality (over 98 per cent CaCO_3), should be delivered at Portland from one of the following places at \$2.50 a ton:

Dall Island, Alaska,
Roche Harbor, San Juan Co., Wash.,
Lime, Ore.,
Santa Cruz, Cal. (mine run).

The deposits at:

Texada Island, British Columbia,
Cle Elum, Kittitas County, Wash.,
Santa Cruz, Cal. (selected),
should be delivered for \$2.75 a ton.

It appears that limestone may be obtained for as low a price as \$2.00 a ton from the San Juan and Orcas Islands, Washington, and from Whatcom County.

San Juan Co., Washington. There are several plants at Roche Harbor, Friday Harbor, and other points on San Juan and Orcas Islands. One Washington quarry has been in continuous operation for practically fifty years.

Baker County, Oregon. Contains a number of large bodies of limestone, some of which have been extensively utilized for lime. One thick deposit crosses Burnt River canyon three miles from Huntington and the tonnage is almost unlimited.

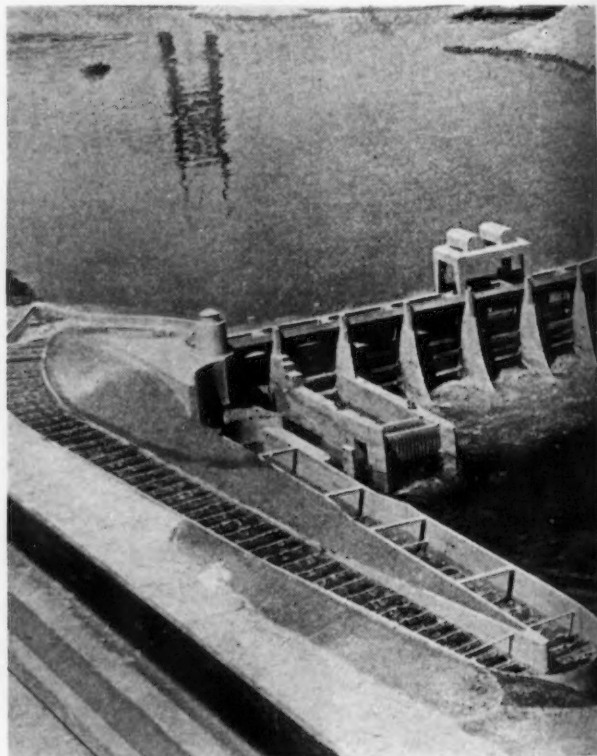
California, Santa Cruz County. The early furnaces in Oregon obtained limestone for flux from the San Juan Islands in Washington. Later limestone from Santa Cruz, Cal., was used. It has 40,000,000 tons proven, with an estimated additional 40,000,000 tons.

Dolomite. At Colville, Wash., is a very large deposit, contain-

ing millions of tons that analyze, SiO_2 2.90 per cent; Fe_2O_3 and Al_2O_3 1.37 per cent; CaCO_3 51.60 per cent; and MgCO_3 40.60 per cent.

It has been quarried since 1917 and about 500 tons a year are shipped, calcined, to Camas, Wash., near Bonneville for \$2.70 a ton. The delivered cost in large quantities should be less than \$4.00 a ton.

Near the limestone quarry at Lime, Ore., are large beds of dolomite. If opened and shipped in conjunction with limestone a very low commodity rate should be ob-



General view of experimental model of spillway and

the Stage for a Iron Industry

and Summary of Estimated Costs



tained. It is estimated that limestone from Lime can be delivered at Portland for \$2.50 a ton or less. Cost would probably be high but should not exceed \$3.50 a ton. Such a price is much lower than Eastern consumers obtain.

If a low enough freight rate were obtained the stone could be calcined at Bonneville, using electric furnaces.

Magnesite. An iron and steel industry in the Lower Columbia River Valley has the advantage in being close to a very large and high grade deposit of magnesite. Since magnesite is preferred over

dolomite and would replace dolomite, if cheap enough, this is a real economic advantage.

At Chewelah, Stevens County, Wash., are deposits that contain over 7,000,000 tons, sufficient to supply the entire American market for 100 years. It can be mined by quarry methods.

Analysis of the dead-burned product is:

	Per cent
MgO	85.5
CaO	3.4
SiO ₂	6.5
Fe ₂ O ₃ + Al ₂ O ₃	7.25
Ignition loss	0.5

It is not only high in magnesia but is high in iron, the necessary ingredient for forming a good binder and is admirably suited for the manufacture of magnesia brick. Its present market is small and price is high. It should be delivered to Bonneville for not more than \$7 a ton, and dead-burned by electric furnace and made into brick for \$2 a ton, thus affording a supply at less than one-half the cost of that available to present iron and steel manufacturers.

In California there are a number of deposits of magnesite. They are all smaller than the Chewelah deposits and more difficult to mine and have a small production

o o o

By EDWIN H. HODGE

Consulting Geologist, North Pacific
Division, U. S. Engineers

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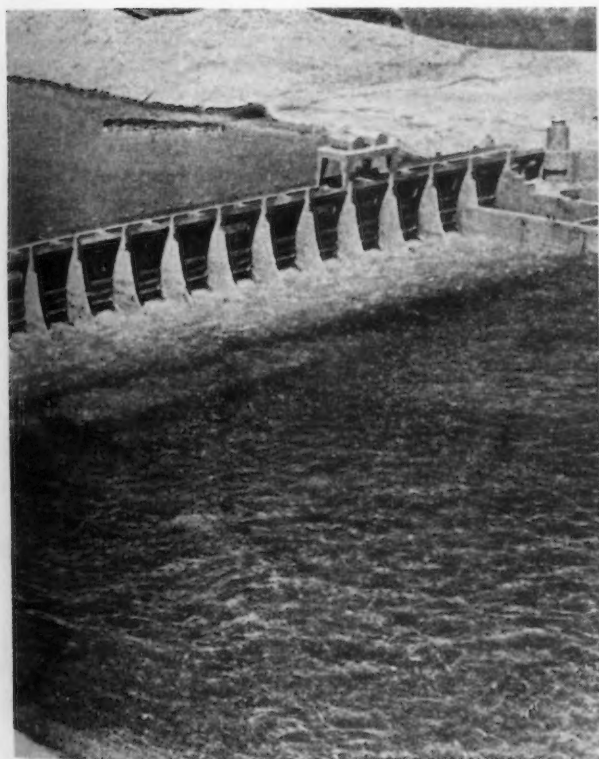
(mostly from underground workings).

Silica. The iron ores recommended in this report are semi-self-fluxing and the Wilkeson coke contains 8 per cent silica. This is fortunate because large deposits of good silica rock for fluxing purposes have always been rare on the Pacific Coast and the deficiency might become acute if an iron and steel industry were established. A supply of silica is worthy of a special investigation. The present supply may be summed up as follows:

(1) A deposit near Denison (Spokane County), Wash. (about 15 miles north of Spokane), appears to be the only available source and its size and quality remain to be proven. If reports are true, it contains 500,000 tons of quartz—a quantity sufficient to serve for 50 years. It is said to be 700 ft. in diameter and 200-ft. high and can be quarried economically and has been used to make silica brick.

(2) Near Overton, Nev., are several large deposits which give washed material of 96 per cent silica and 0.08 to 0.20 per cent of iron oxide.

(3) Silica sands for glass making in California have been largely imported from Belgium but recently deposits of considerable size



fish ladders. View looking southeast and upstream.

and purity have been developed in Contra Costa County, Calif.

(4) Rewashed tailings from the milling and concentration plants of the many mines working siliceous ore in the Western States and provinces may be a source.

(5) Importation from trans-Pacific countries as ballast is possible.

(6) Importation from Ohio and Pennsylvania manufacturers of silica brick.

Fire Clays. Fire clays as variable and neutral refractories, binders and mortars will be needed in large quantities. Fortunately large deposits of fire clay of satisfactory physical and chemical properties are located in the neighboring States to Oregon.

Thus at Mica, Wash., 16 miles southeast of Spokane, is a clay of the following analysis:

	Per cent
Silicia	47.3
Alumina	37.8
Ferric iron	0.9
Magnesia	0.1
Lime	0.1
Water	0.3
Titania	0.9
Ignition loss	12.6

Other deposits in the same region along the Washington-Idaho line between Spokane and Moscow are additional sources of similar quality. Also importation of excellent fire clay from trans-Pacific countries is expectable at low costs.

It is probable that a steady mar-

ket, created by an iron and steel industry, will enable the Washington producers to deliver fire clay to Portland for about \$6.00 a ton.

Chromite. During the war chromite deposits were intensively prospected, explored and mined. As a result there exists a great body of information on these deposits. The known tonnage is as follows:

	Tons
Alaska	240,000
British Columbia	25,000
Washington	10,000
Oregon	85,000
California	230,000
Montana	500,000
Total	1,090,000

Most of these deposits are too small to be mined and shipped at a low cost. Deposits at Port Chatham and Red Mountain, Kenai Peninsula, Alaska, contain 240,000 tons of 45 per cent Cr_2O_3 . These deposits are susceptible of low mining and concentrating costs which should not exceed \$6.00 for mining and \$3.50 for transportation, making the ores of 45 per cent Cr_2O_3 delivered at Bonneville, about \$10.00 a ton or one-half of the average price at New York from 1925 to 1933, which was \$20.81. They could supply the proposed plant for nearly 100 years.

Chromite deposits are very rare near the present centers of iron and steel production. The amount of Western domestic ore available is only 1/1000 of the foreign ore used. Twenty-three per cent of

the foreign sources of supply are nearer the Pacific Coast than to the Atlantic Coast and 34 per cent are as near. Because of the great distance, sources such as New Caledonia, do not export enough ore to become large and cheap sources of chromite. Also several countries contain large deposits that are not exploited because of their distance from eastern centers of consumption.

Manganese. No known deposits of high grade ore occur in the western States that can be mined cheaply or transported at a low cost. Small, undeveloped, low grade deposits are known to exist in several localities in British Columbia, Washington, Oregon and California. In California large bodies of low-grade ore are claimed to be present in deep mines in San Joaquin County.

Trans-Pacific sources available to the Lower Columbia River Valley are: British India, Chile, Java, and Madura, and Union of South Africa. Japan uses more than she produces and absorbs all that China can produce. Rumors of manganese deposits in the Philippines have not as yet been proven.

Very large and high grade deposits exist in India and Chile. India has an established industry and has for a long time supplied foreign markets, including that of the United States. The known ores carry 48-50 per cent manganese.

(CONTINUED ON PAGE 102)

View of downstream side of south half of spillway. Progress photograph of February 10, 1936.



Illinois Manufacturers' Association Condemns Walsh-Healey Law

CONDEMNATION of the Walsh-Healey Government Contract Act, which became effective Sept. 28, is voiced by James L. Donnelly, executive vice-president, Illinois Manufacturers' Association, who says: "This new government contract act is an unwarranted, pernicious piece of legislation, shoved through Congress during the closing days of the session at the instance of the Secretary of Labor and of organized labor leaders. The measure gives the Secretary of Labor the right to control wages, hours and working conditions in the plants of those industries selling supplies to the United States exceeding \$10,000 in value.

"This new act, like the NRA, contemplates that the Federal Government will control hours, wages and working conditions in the industries involved. However, this act differs from the NRA in the respect that the judgment of the Secretary of Labor has been substituted for "voluntary cooperation." Under this act, the Secretary of Labor has practically unlimited power to make investigations, to hold hearings, to require attendance and testimony of witnesses, production of books and records under oath, to make findings and decisions. The penalties are very severe, including the blacklisting for a period of three years, in so far as securing government business is concerned, of firms which the Secretary of Labor

may conclude have violated the act.

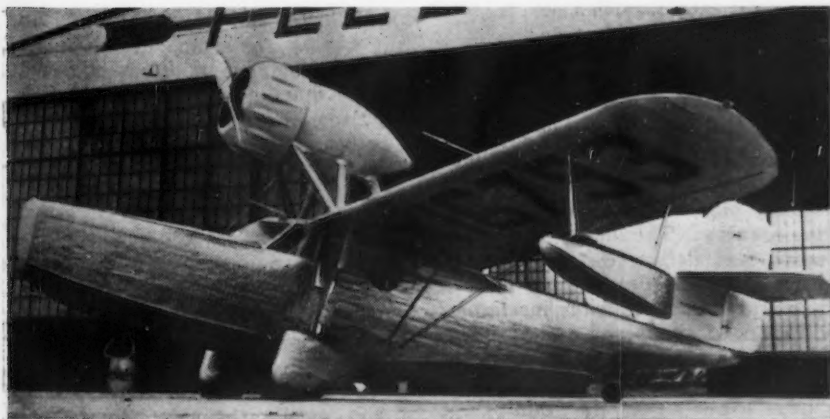
"The practical result of this measure will be to increase the cost of Government supplies, materials and equipment and to give the Department of Labor additional power to harass and snoop on private industry and to discourage bidding by representative manufacturers on the requirements of the Federal Government for materials, equipment and supplies."

The association in a bulletin to its members dated Sept. 28, said: "The potential danger to private industry in this new act is particularly apparent when the elaborate public works program of the Federal Government, contemplating, as it does, extensive purchases on the open market, is taken into consideration.

"We suggest that member firms, in considering their procedure under this act, give consideration to the fact that the act gives power to the Secretary of Labor to 'fix' wage scales, hours and working conditions for all persons employed in the manufacture or furnishing of materials, supplies, articles of equipment used in the performance of the contract; that in the operation of the plant there may be many practical difficulties involved in having the workers engaged on a Government contract conform to a different hour and wage schedule and to different working conditions than those which may be in effect for other workmen in the plant generally

and that accordingly only a relatively small portion of the workers in the plant may be required to perform such contract, the Secretary of Labor may, in effect, fix the hours and wage standards and set the working conditions for all the workers in the plant; that the 'prevailing' wage to be established by the Secretary of Labor will, if precedents heretofore followed by Government officials under prevailing wage scale laws are conformed to, be the highest rate paid to unionized workers in a given community, notwithstanding the fact that such rate may be uneconomic and unwarranted and may be paid to only a small minority of workers in similar lines of work in such locality; that, under paragraph E of section I, a firm entering into a contract with the Government not only contracts that the goods supplied will not be manufactured or fabricated under working conditions in their own plant which are unsanitary or hazardous, but also assumes the obligation to see that all subcontractors or anyone else supplying materials, supplies or equipment to be used in the performance of said contract, conform to such working standards; that the penalties under the act are severe, including the blacklisting for a period of three years, in so far as securing Government business is concerned, of firms which the Secretary of Labor may conclude have violated the act; and that the Secretary of Labor has extensive power to make investigations, to hold hearings, to require attendance and testimony of witnesses, production of books and records under oath, to make findings and decisions."

Stainless Steel Airplane

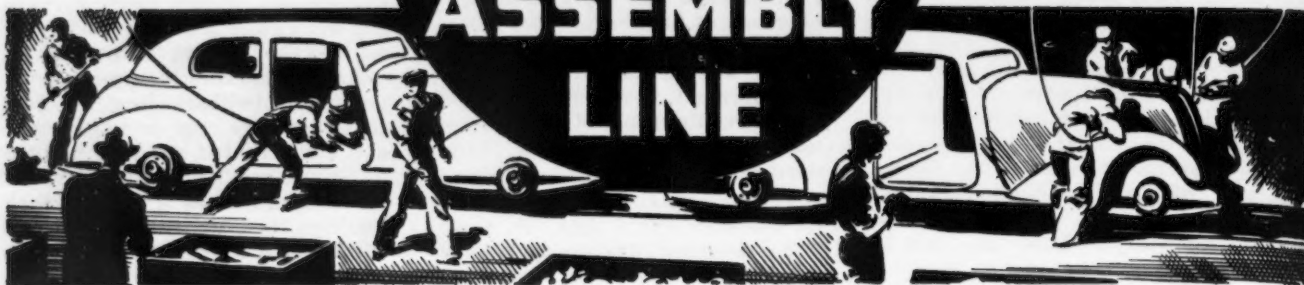


THE first stainless steel airplane ever built for commercial purposes was launched last week at the Fleetwings plant, Bristol, Pa. A four-passenger cabin amphibian, the plane was designed by Carl de Ganahl and Wilson L. Sutton, president and vice president of Fleetwings, Inc., with particular regard for the properties of stainless steel, which offers tremendous strength in proportion to its weight.

The plane was constructed by the "shot-weld" process of fabricating steel, and is said to be lighter in weight than any other plane of comparable size, weighing only 2285 lb. empty, which is 100 to 200 lb. lighter than even a land plane of similar proportions.

Edward G. Budd, builder of stainless steel trains, was the principal speaker at the launching, which was attended by members of the Army and Navy air corps as well as representatives from the commercial aviation field.

THIS WEEK ON THE ASSEMBLY LINE



... Car builders concentrate on building up output of assembly lines and in working out the "bugs" on tremendous amount of new machinery installed during recent weeks.

o o o

... Total production for the week takes slight upward turn, although Chevrolet and Ford are still out of the picture as far as passenger car assemblies are concerned.

o o o

... New models will all have pleasing lines, but the tendency to copy popular style trends still predominates.

o o o

... Distributer conventions are following in rapid succession, but most public announcements will not come until the end of the month.

THE main concern of the automotive industry right now is to get the assembly lines started on the new 1937 product, or if started, as many are, to accelerate production. Chief attention is centered, however, on machinery operations rather than assembly line operations, since a tremendous amount of new equipment has been purchased during the last six months and is now in the process of being installed and put into running order. Chevrolet has all its new cylinder block line installed

and in working order and is building up output as rapidly as possible, so as to feed its various assembly plants scattered throughout the country. The last of the equipment was delivered to Chrysler's East Jefferson plant barely a week ago and both the master mechanics division of the plant and the machine tool service men are battling 24 hours a day to work out the "bugs" and get the equipment rolling.

Deliveries of machine tools have been behind promises, and the ex-

treme pressure put upon the builders to get the equipment in has not helped in eliminating all possible sources of trouble when starting up new lines. When it is considered that literally millions of dollars worth of equipment has been installed in many of these plants, the size of the problem of getting hundreds of machine tools into operation at once can be seen.

Buick has spent a lot of money for new machinery this year, but it is scattered throughout the plant so that the problem of getting it moving has been decentralized. Hence Buick has encountered practically no undue delays and at the end of last week was turning out approximately 500 cars a day. Oldsmobile, with its completely new cylinder block line, is not in such a happy situation and it is from this quarter that most of the pressure is being applied on machine tool manufacturers and local representatives to get the machinery in and get it going fast. The motor line should be rolling by the middle of this week, however, and it will not be long before the first few assemblies of completed cars come down the line. Incidentally, Oldsmobile's \$6,500,000 expansion program, launched this year, has raised the capacity of the Lansing plant from 55 to 85 cars per hour.

Pontiac's New Axle Plant

Pontiac got off to a much earlier start on tooling up for its new \$3,000,000 axle plant and has been in production on the new jobs for several weeks. Production of all rear axle parts for 1937 Pontiac cars, except the axle housing, will come from this plant. Parts include axle shafts, ring gears, bevel drive pinions, differential gears



and spider gears, differential cases and carrier cases. Heretofore these parts were made in the gear and axle plant of Chevrolet. Cast iron parts will be made in Pontiac's own foundry, which was put into operation this spring after a shutdown of several years, while the malleable carrier case will be made by General Motors' malleable foundry in Saginaw. Capacity of the line is 80 units per hour.

Since Pontiac had no axle plant before, the company was able to start from scratch and purchase entirely new equipment. Included in the gear department are 75 of the latest type Gleason spiral bevel gear cutters, in addition to 28 Gleason matching and lapping machines. Although these lines will cut standard spiral bevel gears and pinions, the equipment is universal enough to be adapted for cutting hypoid pinions and gears, should the company later change to this type of drive, as some other units of General Motors are doing this year. Some of the units purchased for the axle line include three six-spindle Bullard Contin-U-Matics and five Mult-Au-Matics, which machine splines, bearings and flanges and drill and countersink the bolt holes in the axle shaft flange. Included in the department is also an automatic atmospheric-controlled hardening and tempering furnace. When the shafts leave here, they enter a battery of centerless grinders which finish the bearing surfaces. Because of the fact that the axle plant is entirely new, it is conceded to be one of the finest in the industry.

Dealer Conventions Being Held

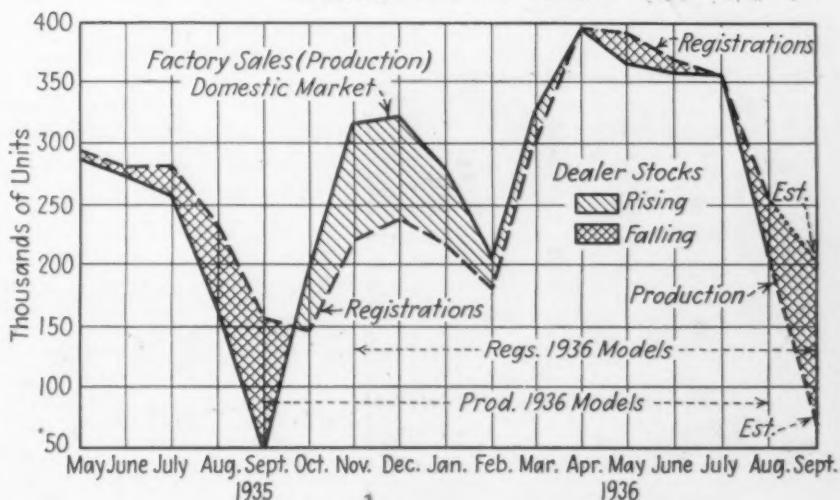
This is the season for sales conventions and previews of the new

models. Last week Hudson, Graham-Paige and Nash called in their distributors to show them their wares and to cheer them on to bigger and better activity this fall. Buick, Oldsmobile and Chevrolet hold their distributor conventions this week, as will several Chrysler divisions. Formal announcements to the public of the new cars are not expected much before the end of the month, however.

From what has been seen so far and from information currently afloat in Detroit, the following general statements are apropos regarding the new 1937 lines. Although it was earlier anticipated that attempts would be made to make the cars as different as possible, this year more than ever there seems to be a tendency for a great many companies to follow certain general trends. The adop-

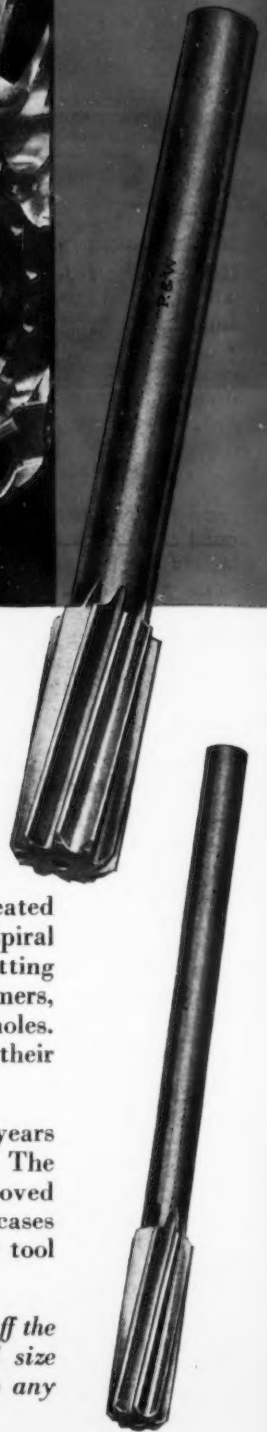
tion of hypoid rear axles by both Chrysler and General Motors, as well as Studebaker, is a case in point. The swing back to disc wheels is another, and in 1937 a great many cars will come equipped with windshield defrosting devices which work off the heater unit. Placing the rear license plate in the middle of the back and putting some styling on the bracket and lighting unit has also been noted in several representative makes. On the whole, it can be said that body lines in most of the cars are more pleasing than they were last year. In fact, from the appearance point of view, it is going to be pretty hard for John Public and particularly Mrs. John Public, to make up his or her mind regarding the different makes. If there is any common tendency, it is to make the designs cleaner in appearance and for this reason particular attention

RELATION OF FACTORY SALES TO DEALERS AND REGISTRATIONS
PASSENGER CARS - U.S. ONLY





Every reamed hole in these cylinder cases for twin radial aircraft engines was roughed and finished with P & W "Blue Helix" Reamers.



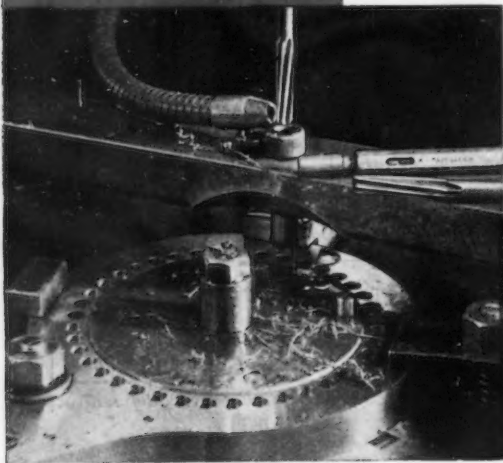
"BLUE HELIX" REAMERS

Reaming holes in a controllable-pitch propeller bracket made of high alloy 315 Brinnell steel, using "Blue Helix" Reamers. The tolerance is less than one half-thousandth. Notice the long, slender curling chips—ample evidence of the keen, shear cutting action of these tools.

These new chucking reamers are made of specially treated high speed steel. They are made with right-hand spiral flutes and are listed in decimal sizes. They are freer cutting as compared with straight or left-hand spiral fluted reamers, and produce cleaner, smoother and more accurate holes. They also have an increased life due to their design and their special P & W hardening treatment.

"Blue Helix" Reamers have been under test for two years in a number of large shops throughout the country. The completely favorable reports from these shops have proved the great superiority of these new reamers. In some cases they have produced more than double the tool life of ordinary reamers.

Write for a copy of our new circular, just off the press, containing complete information and size listings of these new reamers. It is free to any interested executive.



PRATT & WHITNEY DIV.

Niles - Bement - Pond Company

HARTFORD • CONN • U.S.A.

Branch Offices and Agencies:—BIRMINGHAM BOSTON CHICAGO CINCINNATI
CLEVELAND DETROIT LOS ANGELES NEW YORK PHILADELPHIA
PITTSBURGH ROCHESTER SAN FRANCISCO ST. LOUIS

has been paid to fairing in the headlight brackets or the headlight itself into the hood contours. In some cars the horn is being suspended from the headlamp through a streamlined fitting. Fender draws, if anything, are deeper this year than last and the tendency to drawing out the rear fender is more marked. The general contours are practically the same, however, on all models.

Chief differences will be in the front ends, although here again we will see much copying of 1936 styles or modifications of them. Horizontal grille and louvre lines will predominate as in the present Lincoln-Zephyr and the Cadillac. A strip of sheet metal down the center of the grille will also be seen in another car than the Graham-Paige, but triangular in form.

Wider Use of Stainless

Stainless steel is coming into much wider use this year than ever before for body trim. It is being used in radiator grilles, hood trim and body side trim. It is even being used, or will be, in a motor, not for ornament but purely for utility. More steel of the plain carbon variety will also be used in bodies this year. Fisher Body has abandoned all composite wood construction with the exception of a few of the very special body types for cars in the higher priced brackets. Even cars in the Cadillac class, however, have dropped practically all wood in their construction, including floor sills. The steel top is definitely here, and Ford will join in the procession in 1937. Speaking of tops, there is a marked tendency to lower the height of the top from the ground in order to

lower the center of gravity of the vehicle. This has been made possible without reducing body head room largely through the introduction of the underslung propeller shaft on the hypoid drive.

More than one car manufacturer will also exhibit wider bodies this year than last. Hudson gave the public of Detroit a chance to look at its new 1937 cars last week and they noted a line of advanced styled cars in both the Terraplane and Hudson models with 2 in. longer wheelbases, roofs 2 in. lower and bodies 5 to 6 in. wider. This has necessitated a wider frame, with running boards somewhat narrower than on the last year's cars. Incidentally, Hudson's electric hand gear shifter is again optional equipment on both models. It assumes a new importance in 1937, as it will be used in connection with a new mechanical development which company engineers predict will be one of the hit motor car features of the year.

The use of plastics for instrument panels and knobs as well as for steering wheels is becoming increasingly evident.

Production Gaining

With public announcement dates not very far off, the pace on the assembly lines has been stepped up during the past week. Ward's Automotive Reports estimated production of passenger cars and trucks for the week ended Oct. 4 at 23,175 units, compared with 20,597 in the preceding week. Except for commercial assemblies, Ford was practically out of the picture last week and Chevrolet had not yet started its assembly line, although the motor line is in

operation. Of the volume producers, Plymouth is in the most favorable position and its production should reach 2000 cars a day by the end of this week. Dodge should also swing sharply into line this week and should attain its new volume of 1600 units a day within a very short time. Last year Dodge assembled about 1300 cars a day. Buick and Hudson also marked up sharp gains in their output rates last week and should increase their pace this week. Ford resumed operations on Monday after a brief shutdown, but will concentrate on parts production this week. Outside suppliers will ship parts at the rate of 1000 a day for the present.

Steel Commitments

Just prior to Sept. 30 automobile companies placed large orders for those steel items that were advanced in price on Oct. 1. As a result, October is expected to be a light month from an order point of view on such items as hot rolled carbon bars and sheets that are neither annealed nor oiled. Some suppliers report releases on body sheets as still rather light, although plants are booked up to Dec. 1 and beyond on these products. Many other suppliers report, however, that the plants cannot get material in fast enough and are pressing the mills particularly hard on certain products for which the specifications were only known last week. Those plants already in production, like Buick and Packard, seem to be well supplied with steel at the present time and it is understood that the Ford Motor Co. has built up a reserve inventory amounting to a 15-day supply, so as not to be left out on a limb, owing to extended delivery schedules.

PART of Pontiac's \$3,000,000 investment in rear axle making machinery consists of this battery of 75 Gleason gear cutting machines. Although this equipment could put Pontiac in the hypoid rear axle class along with other General Motors units, it will be used to cut standard spiral bevel gears and pinions for the present.



Pig Iron Daily Output

Up 4.2% in September

PRODUCTION of coke pig iron in September, at 2,730,293 gross tons, compares with 2,711,721 tons in August. The daily rate last month showed a gain of 4.2 per cent over that of August, or from 87,475 tons to 91,010 tons.

On Oct. 1, there were 155 furnaces making iron, operating at a rate of 94,140 tons, compared with 148 furnaces on Sept. 1, producing at the rate of 88,075 tons daily. The Steel corporation blew in two furnaces, independent producers put five in operation and merchant producers blew in two furnaces and took two off blast.

Furnaces blown in included: One Edgar Thomson, Carnegie-Illinois Steel Corp.; one Donora, American Steel & Wire Co.; one Lackawanna, one Sparrows Point, Bethlehem Steel Co.; one Campbell, Youngstown Sheet & Tube Co.; one Madeline, Inland Steel Co.; Sharpsville, Pittsburgh Coke & Iron Co.; Standish, Chateaugay Ore & Iron Co.; Hamilton, American Rolling Mill Co.

The only furnaces blown out were the Oriskany unit of the Lavino Furnace Co., and the Rockdale furnace of the Tennessee Products Corp.

Daily Average Production of Coke Pig Iron

	Gross Tons				
	1936	1935	1934	1933	1932
January	65,351	47,656	39,201	18,348	31,380
February	62,886	57,448	45,131	19,798	33,251
March	65,816	57,098	52,243	17,484	31,201
April	80,125	55,449	57,561	20,787	28,430
May	85,432	55,713	65,900	28,621	25,276
June	86,208	51,750	64,338	42,166	20,935
½ year	74,331	54,138	54,134	24,536	28,412
July	83,686	49,041	39,510	57,821	18,461
August	87,475	56,816	34,012	59,142	17,115
September	91,010	59,216	29,935	50,742	19,753
October		63,820	30,679	43,754	20,800
November		68,864	31,898	36,174	21,042
December		67,950	33,149	38,131	17,615
Year		67,556	43,592	26,199	23,733

Production of Coke Pig Iron and Ferromanganese

	Gross Tons		Ferromanganese†	
	Pig Iron*		1936	1935
	1936	1935	1936	1935
January	2,025,885	1,477,336	24,766	10,048
February	1,823,706	1,608,552	24,988	12,288
March	2,040,311	1,770,028	22,725	17,762
April	2,403,683	1,663,475	19,667	18,302
May	2,648,401	1,727,095	18,363	17,541
June	2,586,240	1,552,514	17,549	12,961
½ year	13,528,226	9,799,000	128,058	88,902
July	2,594,268	1,520,263	20,205	13,175
August	2,711,721	1,761,286	20,658	12,735
September	2,730,293	1,776,476	15,919	15,983
October		1,978,411		19,007
November		2,065,913		18,245
December		2,106,453		17,126
Year		21,007,802		185,173

*These totals do not include charcoal pig iron.
†Included in pig iron figures.

Merchant Iron Made, Daily Rate

	Tons				
	1936	1935	1934	1933	1932
January	10,537	3,926	7,800	2,602	6,256
February	11,296	6,288	7,071	2,863	7,251
March	10,831	7,089	7,197	2,412	1,157
April	13,897	8,799	8,838	1,908	5,287
May	12,814	8,441	9,099	3,129	4,658
June	14,209	7,874	9,499	4,088	6,090
July	11,619	8,644	7,880	6,783	3,329
August	12,148	8,194	6,043	7,756	3,070
September	12,526	10,090	4,986	10,034	3,213
October		11,199	5,765	8,634	4,286
November		12,503	6,610	7,639	4,435
December		13,312	4,399	8,358	3,674

Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons)		October 1		September 1	
	September (30 Days)	August (31 Days)	Number in Blast	Operating Rate, Tons a Day	Number in Blast	Operating Rate, Tons a Day
New York:						
Buffalo	181,472	179,724	11	6,565	10	5,800
Other New York and Mass.	27,266	32,934	3	960	2	915
Pennsylvania:						
Lehigh Valley	55,658	57,517	5	1,855	5	1,855
Schuylkill Valley	23,780	26,767	2	795	2	865
Susquehanna and Lebanon Valleys	18,143	14,692	1	605	1	475
Ferromanganese			0		0	
Pittsburgh District	628,256	636,513	33	21,870	31	20,700
Ferro. and Spiegel	14,358	12,668	3	480	3	410
Shenango Valley	57,931	52,462	4	2,070	3	1,690
Western Pennsylvania	78,437	81,932	4	2,615	4	2,645
Ferro. and Spiegel	5,573	5,578	1	185	1	180
Maryland	109,217	100,199	5	4,200	4	3,230
Wheeling District	144,971	149,435	7	4,835	7	4,820
Ohio:						
Mahoning Valley	280,747	272,179	14	9,360	13	8,780
Central and Northern	248,741	251,247	14	8,290	14	8,165
Southern	44,350	26,827	4	1,480	3	865
Illinois and Indiana	533,334	521,858	25	18,445	24	17,345
Michigan and Minnesota	79,500	81,654	5	2,975	5	2,635
Colorado, Missouri and Utah	30,289	29,717	2	1,010	2	960
The South:						
Virginia			0		0	
Ferro. and Spiegel	411	2,412	0		1	80
Kentucky	25,960	25,830	2	865	2	835
Alabama	140,404	148,083	10	4,680	10	4,775
Ferromanganese			0		0	
Tennessee	1,495	1,493	0		1	50
Total	2,730,293	2,711,721	155	94,140	148	88,075

Colored Strip Steel Placed on Market

COLD-ROLLED strip steel in colors, which will be popularized as Acme Colorstrip, is the latest innovation of the Acme Steel Co., Chicago. As described in a company notice, the new material will be obtainable in practically all colors and shades and will withstand bending, drawing and forming. The extra cost of lacquering the strip, it is claimed, represents only a fraction of the cost of coloring the product after it is formed.

Armco Sues, Charging Patent Infringement

ASUIT has been filed in the United States District Court at Buffalo by the American Rolling Mill Co. seeking to restrain the Bethlehem Steel Co. from the use of its new continuous hot strip mill at the Lackawanna plant, Buffalo, on the ground that it infringes the American Rolling Mill Co.'s patents.

Capitalizing ON THE POSSIBILITIES OF Durez



*designers create four new products — each
a radical departure in its own field.*

NO WALLFLOWER. This new Sears Roebuck radio will never need to be stuck away against a wall to hide the "innards". The cabinet appears symmetrical from both front and back because the chassis is slipped in *from the bottom*. The Durez cabinet is light in weight, self insulating, and economical to manufacture. It has good acoustic qualities, is non-resonant.

CLASS PRODUCT INVADES MASS MARKET

The new Argus candid camera sells at an amazingly low price—but that doesn't mean the makers scrimped on any part of it. One of the major reasons for the low price is the Durez case. The whole complicated piece is molded to exacting specifications in one operation. It pops out of the mold complete with recesses, lugs, holes *and the final surface finish*.



CLOCKS THAT HIDE THEIR MERITS

When a woman first sees these Durez cases for automatic stove timers, she likes their sleek, lustrous finish, likes the way they harmonize with a modern stove. After the case has been in use for a time, she discovers other advantages . . . boiling water, accidentally spilled foods and cleaning materials can't damage them. One swipe with a damp cloth, and the case is new again.

PARING OFF WEIGHT, MAKING A BETTER PRODUCT

Nearly two feet long, the new Durez Art-Chrome rinse trays fit tightly around the neck, catch rinsing water poured over the head. They never feel cold to the skin, are much lighter than metal trays formerly used. Abuse and battering can't dent or chip them . . . they will never peel, warp or crack . . . soap and water won't dull the finish.



DUREZ

MOLDING COMPOUNDS

The above illustrates a few of Durez' advantages. Are you familiar with all of them? For further data, and copy of free monthly "Durez News", write (telling what you make) to General Plastics Inc., 110 Walck Road, No. Tonawanda, N. Y.

Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	August, 1936	July, 1936	August, 1935	Eight Months, 1935	Eight Months, 1936
Raw Materials:					
Lake ore consumption (gross tons)*.....	3,968,845	3,826,050	2,615,927	19,170,108	27,407,391
Coke production (net tons) ^b	3,993,602	3,828,548	2,833,707	22,468,866	29,117,450
Pig Iron:					
Pig iron output—monthly (gross tons)*.....	2,711,721	2,594,268	1,761,286	13,080,549	18,834,215
Pig iron output—daily (gross tons)*.....	87,475	83,686	56,816	53,829	75,944
Castings:					
Malleable castings—production (net tons) ^d ...	42,253	44,413	35,245	296,057	360,758
Malleable castings—orders (net tons) ^d	45,179	41,031	35,602	281,356	351,265
Steel castings—production (net tons) ^d.....	.....	78,654	34,972	247,022	.....
Steel castings—orders (net tons) ^d.....	.....	74,001	45,426	262,366	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons)*.	4,195,130	3,922,731	2,915,930	21,226,408	29,444,196
Steel ingot production—daily (gross tons)*....	161,351	150,874	107,997	102,543	141,559
Steel ingot production—per cent of capacity*.	73.52	68.74	48.78	46.31	64.5
Finished Steel:					
Trackwork shipments (net tons)*.....	6,401	6,216*	4,028	29,657	47,209
Steel rail orders (gross tons)*.....	5,800	56,880	9,400	317,157	659,028
Sheet steel sales (net tons) ^e	207,781	192,873	207,140	1,558,438	1,608,740
Sheet steel production (net tons) ^e	202,456	217,651	206,613	1,578,011	1,694,765
Fabricated shape orders (net tons)*.....	95,390	188,053	102,859	687,806	1,034,114
Fabricated shape shipments (net tons)*.....	127,106	147,824	122,749	728,145	952,344
Fabricated plate orders (net tons) ^d	28,319	60,324	23,628	141,980	318,125
Reinforcing bar awards (net tons)*.....	33,770	45,245	13,590	136,140	255,610
U. S. Steel Corpn. shipments (tons) ^b	923,707	950,851	624,497	4,726,290	6,905,904
Ohio River steel shipments (net tons) ⁱ	113,560	110,495	92,501	578,613	689,676
Fabricated Products:					
Automobile production, U. S. and Canada ^k ...	275,951	451,474	247,686	2,970,913	3,322,249
Construction contracts, 37 Eastern States ^l....	.....	\$294,833,800	\$168,557,200	\$1,024,423,000	.....
Steel barrel shipments (number) ^d	588,660	752,223	600,993	4,189,606	5,186,644
Steel furniture shipments (dollars) ^d.....	.....	1,510,716	1,327,252	9,450,546	.....
Steel boiler orders (sq. ft.) ^d	1,074,597	1,109,849	543,975	3,736,620	6,846,063
Locomotive orders (number) ^m	3	9	0	21	134
Freight car orders (number) ^m	3,225	4,469	100	7,183	34,248
Machine tool index ⁿ	127.5	150.1	125.8	†112.2	†135.5
Foundry equipment index ^o	145.4	159.6	113.0	†102.4	†148.8
Foreign Trade:					
Total iron and steel imports (gross tons) ^p....	.....	47,940	31,312	246,097	.....
Imports of pig iron (gross tons) ^p.....	.....	12,496	8,568	67,573	.....
Imports of all rolled steel (gross tons) ^p.....	.....	19,638	17,657	129,348	.....
Total iron and steel exports (gross tons) ^p....	.....	296,738	247,312	2,140,048	.....
Exports of all rolled steel (gross tons) ^p.....	.....	93,365	82,866	577,704	.....
Exports of finished steel (gross tons) ^p.....	.....	83,599	64,400	497,988	.....
Exports of scrap (gross tons) ^p.....	.....	192,817	156,658	1,481,132	.....
British Production:					
British pig iron production (gross tons)*.....	635,800	661,100	543,400	4,263,700	5,046,000
British steel ingot production (gross tons)*....	872,700	974,100	759,900	6,364,400	7,591,000
Non-Ferrous Metals:					
Lead production (net tons)*.....	33,542	39,576	34,856	261,759	297,133
Lead shipments (net tons)*.....	46,388	38,996	38,195	268,202	299,861
Zinc production (net tons) ^t	43,614	45,553	35,547	280,543	352,899
Zinc shipments (net tons) ^t	46,085	41,891	38,824	286,102	340,463
Deliveries of tin (gross tons) ^v	5,385	7,120	5,320	39,000	49,525

†Three months' average. *Revised.

Source of figures: *Lake Superior Iron Ore Association; ^bBureau of Mines; ^cTHE IRON AGE; ^dBureau of the Census; ^eAmerican Iron and Steel Institute; ^fNational Association of Flat-Rolled Steel Manufacturers; ^gAmerican Institute of Steel Construction; ^hUnited States Steel Corp.; ⁱUnited States Engineer, Pittsburgh; ^jWhen preliminary, from Automobile Manufacturers Association—Final figures from Bureau of the Census; ^kF. W. Dodge Corp.; ^lRailway Age; ^mNational Machine Tool Builders Association; ⁿFoundry Equipment Manufacturers Association; ^oDepartment of Commerce; ^pBritish Iron and Steel Federation; ^qAmerican Bureau of Metal Statistics; ^rAmerican Zinc Institute, Inc.; ^sNew York Commodities Exchange.



• THE IRON AGE Weekly Index Numbers of Capital Goods Activity

(1925-27 Average = 100)

Last week	77.7	Same week 1933	50.7
Preceding week	77.6	Same week 1932	32.6
Same week last month	80.1	Same week 1931	52.5
Same week 1935	57.4	Same week 1930	77.0
Same week 1934	40.6	Same week 1929	113.1

THE IRON AGE's index of industrial business operations rose 0.1 point last week to 77.7 per cent of the 1925-27 average, or normal. A larger increase would better have represented general conditions, but was prevented by the trend of activity in the automotive industry. Steel mills were more active, lumber movement expanded and heavy construction work intensified. The important Pittsburgh district

factor showed little or no change.

Although the index has declined since August when it attained its top level this year, it is still in pleasing contrast to former year comparison. The current 77.7 showing contrasts with 57.4 last year and 40.6 in 1934 for corresponding weeks. It also compares with a level of but 77.0 in 1930, thus leaving only 1929 as its superior.

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Reports, Inc.; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

Safety Awards Made To Steel Plants

OUT of a total of 202 steel plants and units entered in the National Safety Council's Metals Sections Safety Contest, 16 went through the year ended June 30 with a perfect no-accident record.

The winners, according to rank

in Group A of the steel mills division, were: Continental Steel Corp., Kokomo division, Kokomo, Ind.; Republic Steel Corp., South Chicago works, Chicago; and Great Lakes Steel Corp., Ecorse, Mich. In Groups B and C, Youngstown Sheet & Tube Co., South Chicago works, Chicago, was first; Great Lakes Steel Corp., Hanna Furnace division, Ecorse, Mich., was second; and third was the Niles plant of Republic Steel Corp., Warren, Ohio.

During the year, 267,792 employees worked 561,788,579 man-hours. The average rate of disabling injuries per million hours worked was 8.03.

Announcement of the winners was made at the 25th annual National Safety Congress and Exposition at Atlantic City. Bronze plaques were awarded to first place winners and certificates were given to winners of second and third prizes.

WASHINGTON



By L. W. MOFFETT

Resident Washington Editor,
The Iron Age

WASHINGTON, Oct. 6. — Based on 481 reports from member organizations, John W. O'Leary, chairman of the committee on employment of the Chamber of Commerce of the United States, told the chamber board at its fall meeting last Friday that private employment in mid-September showed a gain of at least 7,000,000 in wage and salary workers since employment was lowest in the depression. The committee report, which was preliminary, said that it is clearly evident that estimates of unemployment have been greatly exaggerated and that estimates of unemployment on a national basis are necessarily inaccurate and useless for practical purposes.

The committee reiterated its conviction that employment is a local matter, with many local variations, and that unemployment is likewise local. It made suggestions for relieving the unemployment situation. The final report of the committee will be made upon receipt of further information and it will be presented in final form at the next meeting of the board for action. Mr. O'Leary is president of the Machinery and Allied Products Institute.

The board also heard an insistent demand by Fred H. Claussen, Horicon, Wis., for a balanced Federal budget for the next fiscal year in the interest of sound financial and economic progress. Mr. Claussen is chairman of the chamber's Federal finance committee and president of the Van Brunt Mfg. Co., maker of agricultural machinery. Simultaneously with his de-

... *Chamber of Commerce of United States reports gain of 7,000,000 in wage and salary workers in private employment from low of depression.*

o o o

... *Fred H. Claussen, Wisconsin manufacturer, makes plea to Chamber for balanced Federal budget and revision of tax on undistributed earnings of corporations.*

o o o

... *Secretary Ickes brings charges against copper tubing companies for alleged collusive bidding; FTC issues complaints for violation of Robinson-Patman Act; test case expected.*

mand for a balanced budget, Mr. Claussen urged repeal of the surtax on undistributed earnings of corporations and a return to a straight tax on their incomes. He also proposed other changes in the tax law to encourage business and thus improve the Government's fiscal situation.

Many Suggestions Offered

The committee on employment proposed the following:

Immediate expansion of facilities in the states and communities for young people, and for workers desiring to increase their skill.

Examination of vocational training programs with a view to adjusting them so as to provide aid in the creation of skilled workmen in classifications where definite shortages are becoming evident.

Provision for training unskilled workers on relief. In one industrial city selected men are being taken from relief rolls, given a short and intensive course of training in the local trade school, and then placed in jobs in private enterprise, the committee pointed out.

Directing attention to the need for training of skilled workers who have lost their former aptitudes or who now must undertake a different line of skilled work.


Examination of relief rolls to prevent ineligible persons from obtaining relief. This was said frequently to take the form of a plan whereby relief rolls are systematically checked against payrolls of principal firms, with payrolls kept in the custody of the chamber.

Analysis of relief registrations and sample studies of case histories for the purpose of obtaining accurate information on just how employable the registrants are. In developing this activity, the report pointed out, an effort is made to determine what work was done prior to the depression by persons now on relief.

Presentation to the chief executives of business concerns of the desirability of their giving further personal attention to the possibility of their business needing the services of persons now unemployed and available.

Arrangement with relief officials (1) to allow persons on relief to use relief time for interviews in endeavors to obtain private employment, and (2) to assure persons on relief that they will be returned to relief if private employment proves of a brief term.

Circulation of lists of employ-



★ *Jack of one trade,*
and a master at it

★ **HOT *and* COLD**
ROLLED
STRIP STEEL

Since 1897, West Leechburg has confined itself solely to the production of hot and cold-rolled strip steel of the very highest quality . . . *dependable in delivery, exacting in detail.* We have the capacity to supply and satisfy *any demand, large or small.* We work with any steel, including all grades of Allegheny Stainless—to any size, from 1/2" to 24". For

widths from 2 1/2" to 8", we recently installed new equipment specially designed to produce long coils . . . less handling cost, less idle time for you. ● *Experience is a stern school, but it gets results!* Specify West Leechburg Strip, controlled for quality from open-hearth to finished product, backed by 40 years of "know-how"!

ALLEGHENY STEEL COMPANY - - - BRACKENRIDGE, PENNA.
WEST LEECHBURG DIVISION

Sales Offices and Warehouse Stocks in the Principal Cities
Warehouse Stocks carried by JOS. T. RYERSON & SON, INC., WAREHOUSES . . . Union Hardware & Metal Co., Los Angeles . . . American Brass & Copper Co., San Francisco — Oakland
ALLEGHENY PRODUCTS: SHEETS FOR AUTOMOBILE BODIES, METALLIC FURNITURE, DEEP DRAWING, ALLEGHENY METAL, ALLEGHENY STAINLESS STEELS, ELECTRICAL SHEETS, STRIP STEEL, STEEL CASTINGS, SEAMLESS TUBING, BOILER TUBES, PIPE.
(Allegheny Metal is licensed under Chemical Foundation Patents Nos. 1,316,817 and 1,339,378)

WEST LEECHBURG . . . HEADQUARTERS FOR STRIP STEEL,
including all grades of ALLEGHENY STAINLESS

ables on relief with information as to their skills and aptitudes among local manufacturers and other employers.

Cooperation with public employment offices which list employable persons on relief in any of its forms, for the purpose of increasing their efficiency in making placements in private employment.

Endeavor to see that work-relief projects are useful, not dis-

ruptive of normal activities, and being useful are not abandoned at partially completed stages.

Examination of the effects locally of the policies and rules of the WPA upon reemployment in private enterprise. Where such rules and policies are retarding reemployment, changes to offset such retarding influences should be urged.

Budget Could Be Balanced

Mr. Claussen told business leaders attending the board meeting that the anticipated increase in Government revenues, due to expanding business and a \$500,000,000 cut in expenditures, would be sufficient to avoid any increase in the national debt next year. He insisted, however, that a reduction in expenditures should have first consideration in any plan to balance the budget rather than resort to new or additional taxes. It was stated that, as set up in the budget, the indicated deficit for this year, excluding bonus payments and the sinking fund, is \$1,000,000,000. A 10 per cent increase in tax yield, Mr. Claussen said, would produce more than \$500,000,000, and in view of increasing business activity such increase does not appear unlikely. This would leave about \$500,000,000 to be met by a cut in expenditures. Since practically all of the old-line Government agencies are now spending from 50 to 100 per cent more than they did in 1933, it was declared, and improved business conditions should make possible reductions in recovery and relief expenditures, it ought not to be difficult to cut this relatively moderate amount from expenditures.

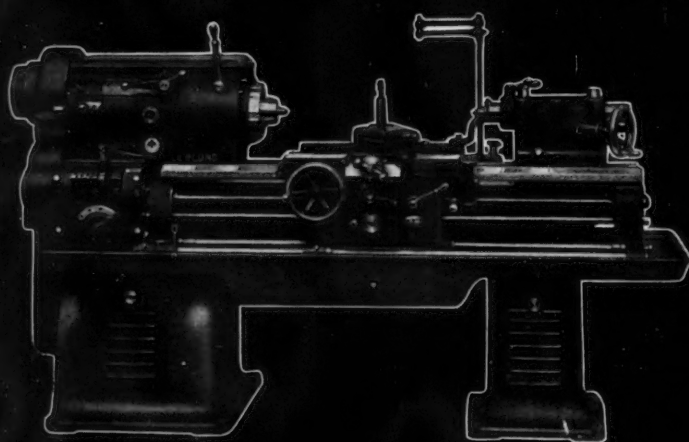
In advocating a balanced budget, Mr. Claussen urged that the chamber and its member organizations stress the menacing aspects of excessive spending with its resulting deficits, inflationary debt policies and heavy taxation.

Earnings Tax Assailed

In proposing repeal of the surtax on undistributed earnings of corporations and a return to a straight tax on their incomes, Mr. Claussen declared that "opposition to this tax continues to gather momentum as its harmful effects on business recovery and reemployment become more generally understood. Its adverse effects on numerous corporations, which because of the depression are in no position to pay dividends, its fostering of unfair competition, the failure of the 'relief' provisions, especially as now interpreted, to give relief in needed cases, its conflict with state law, its discrimination as between different types of corporations, the impossibility of meeting the requirements of the law in many instances, the terrific penalties for honest mistakes, its discrimination against small stockholders, its interference with corporate management all combine with its general retarding effect on business recovery to condemn this revolutionary tax."

Mr. Claussen further suggested

The LeBLOND TOOL ROOM LATHE



Brand New in Design and Performance

Quiet, smooth, powerful performance combined with maximum adaptability makes the LeBlond Tool Room Lathe indispensable to the economical operation of the tool room.

Advanced LeBlond engineering and unexcelled quality construction are evident in every detail of this new lathe, its trouble-free operation, capacity for precision work, adaptability to every tool room need.



BROCHURE . . . Write for literature describing the new features; ground gears — built in reverse to lead-screw — 3 point spindle support, and other features.

The R. K. LeBLOND
MACHINE TOOL CO., CINCINNATI, O.
20 North Wacker Drive, Chicago 103 Lafayette St., New York
HALF CENTURY OF SERVICE TO INDUSTRY

NEW MONARCH LATHES DOUBLE TAPER TURNING CAPACITY

Equipped with Ball Bearings To Stop Wear, End Friction

(By Special Correspondent)

SIDNEY, OHIO—Industry took another stride forward today, with the announcement of a new Anti-Friction Bearing Taper Attachment which will result in tremendous savings to users of this versatile equipment. The Monarch Machine Tool Company, famed pioneers in machine tool progress, developed this new feature and have applied for patents.



Top illustration: Threading an oil tool joint on a 20" Monarch lathe with the anti-friction bearing taper attachment. The chip guards were removed when this photograph was taken.

Bottom illustration: Threading a tapered oil joint on a Monarch 24" lathe equipped with the new anti-friction taper attachment. This is a real test.

Now, for the first time in turning history, lathes may come equipped with taper attachments with permanent oil seal ball bearings — twenty in all! Tested and time-proven under the most trying industrial conditions, they have shown immeasurable advantages over ordinary taper attachments. Five outstanding results of the attachment are immediately apparent:

1. Removes all friction; 2. Eliminates wear; 3. Prevents backlash; 4. Ends lost motion; 5. Doubles taper capacity.

On a 20" Monarch lathe, for example, cuts $1\frac{1}{8}$ deep .090" feed, $6\frac{1}{2}$ " tapers per foot, have been turned in steel with the greatest ease and smoothness. After reversing the feed, the tool backtracks without removing metal, indicating the total absence of lost motion or spring. The ball bearings are provided with eccentric stud mounting so that adjustment can be made if ever required. No lubrication is needed, and there is nothing to wear or get out of adjustment on these new attachments. Chip guards are regularly supplied.

OIL TOOL SHOPS TOUGH ON TAPER ATTACHMENTS

At Last They Have Found One That Can "Take It!"

The user who sent us these photographs writes: "We have had four Monarch lathes in our shop for the past year and a half and we find them to be real production tools... giving us more and better work than any other lathes in our shop. We consider the ball bearing taper attachments an outstanding improvement."

The development of the Anti-Friction Taper Attachment marks another triumph for Monarch pioneering. Translated into profit for Monarch customers, this and other improvements are already resulting in hundreds of thousands of dollars annually in increased production, greater efficiency, improved product, lessened depreciation, and lower costs. It is one of industry's most inspiring records.

The Monarch taper attachment has these advantages:

1. Turns (or bores) smooth, accurate tapers under all conditions.
2. Takes far heavier cuts than are possible with the conventional friction type.
3. The tool is guided smoothly and yet so rigidly that even the heaviest cuts are smooth and accurate at the most acute angles.
4. Saves much time and improves quality and accuracy.
5. Far steeper tapers can be bored than with other taper attachment.

EDITOR'S NOTE: For more information about the new attachment, write the Monarch Machine Tool Company, Sidney, Ohio. Ask for Bulletin "S-1"

that "there should be insistence on improvement in, if not elimination of, the capital gains and loss section of the present revenue act." He stated that the present provisions are utterly unfair in that all gains are subject to taxes, while the right to deduct losses is rigorously curtailed. The present rates were declared to be much too high, interfering with, or at times precluding, business transactions which would otherwise take place.

Finally, Mr. Claussen urged a revision of the present excises, most of which expire by statutory limit on June 30, 1937. Mr. Claussen urged repeal of those which unduly interfere with trade activity or impose burdens or annoyances out of proportion to revenues, and reduction of those rates which are too high in relation to others.

Collusive Bidding Charged on Tubing

HAROLD L. ICKES, the Secretary of the Interior and Public Works Administrator, has turned over to the Department of Justice additional investigational work in connection with charges of collusive bidding. Some time ago he caused the department to make investigation of three steel companies which he charges with collusive bidding in connection with sheet piling for PWA work. This inquiry is now under way.

The new charges were turned over to the department last Friday and are directed against 17 producers of copper cable and steel tubing. The bids were submitted to the Bureau of Reclamation at its office in Denver in connection with the North Platte, Neb., reclamation development project and the Grand Coulee dam in the Columbia River basin in Washington. An award at \$16,487 was made to the Nehring Electrical Works, DeKalb, Ill., for supplying copper cable and wire for the North Platte project. Ickes said that of 14 proposals received Aug. 20 at the Denver office, seven companies offered goods at a delivered cost of \$16,501, while two additional bidders submitted an identical bid of \$16,506.

Prior to making charges in the Grand Coulee dam case, Ickes awarded a \$19,741 contract for steel tubing to the M. B. Austin Co., Chicago. He stated that of the 10 proposals received by the Denver office Aug. 27 for the steel tubing, seven were identical, with a delivered cost of \$22,013.

At the same time he announced these charges, Ickes rejected all bids for construction of superstructures, because of allegedly excessive prices, on the Brewster clear-

ance project in Detroit. New bids have been invited.

Robinson-Patman Act to Be Tested

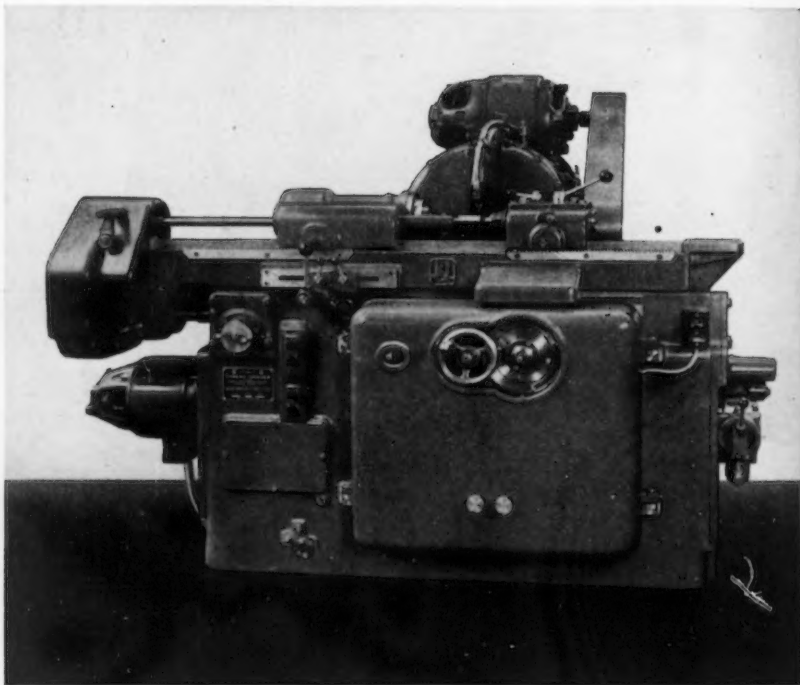
THE much-discussed Robinson-Patman Price Discrimination Act finally has been put in motion by the Federal Trade Commission, and it is to be presumed the constitutionality of the act is about to be tested. Charges against two cheese companies, a floor-covering producer and Montgomery Ward & Co., Inc., Chicago, the first to be issued under the new law, were announced last Friday.

The complaints against the cheese companies are substantially similar and charge violation of section 2 (a) of the Clayton Act. They

allege discrimination in price between different purchasers, with the effect of lessening and injuring competition between the respondent manufacturers and other manufacturers and distributors and also with the effect of lessening competition between customers, some of whom are alleged to receive favored prices. The other is a joint complaint. It is directed against Bird & Son, Inc., the Bird Floor Covering Sales Corp., a subsidiary of Bird & Son, East Walpole, Mass., and Montgomery Ward & Co. Bird & Son and its subsidiary are alleged to have violated section 2 (a) by selling floor covering to Montgomery Ward & Co. at substantially lower prices than they sell to competing retailers. Montgomery Ward & Co. are

NO ADJUSTMENTS NECESSARY WHEN

AUTOMATIC WHEEL TRUEING AND WORK SIZING



J & L AUTOMATIC THREAD GRINDING MACHINE

Gratifying, indeed, has been the response to our recent announcement of the J&L Automatic Thread Grinding Machine. And doubly gratifying, because a majority of those responding have been manufacturers who formerly built special purpose thread grinding machines for their own needs. These same manufacturers are now turning to J&L. Why? Consider the number of jobs this one machine can handle: single, double, triple, quadruple, or sextuple threads; straight, taper, double taper, or combination of straight and taper threads (no compensations for lead required). These threads may be ground on either hard or soft

A MACHINE WITH A BACKGROUND OF

charged under section 2 (f) with knowingly receiving the discrimination in price.

The act says "it shall be unlawful for any person engaged in commerce * * * knowingly to induce or receive a discrimination in price which is prohibited by this section."

Under the law the commission has the power to limit discounts if it finds large purchasers receiving them are so few as to render differentials "promotive of monopoly." The significance of this latter complaint apparently is the effort to prohibit what are deemed to be unduly large discounts granted to large buyers to the alleged discrimination against small buyers. It brings forth an entirely new provision. The complaints

against the cheese companies do not include purchasers, but allege the granting of larger allowances than are made available to competing buyers.

Respondents are allowed 20 days from the date of service of the complaints to file answers. If after hearings the commission finds what it considers justification of the complaints it can issue cease and desist order. Refusal to comply with such order means that the commission can take cases to the Federal Court of Appeals for enforcement of its orders.

▼ ▼ ▼

Supreme Court In Session

THE "horse and buggy" court, even without wearing disguises, dared to return to Washington and

resume its job yesterday. . . . In less dignified quarters, this court is known as the Supreme Court of the United States . . . and just as it has been kept busy far beyond code hours under loads of challenged New Deal legislation, it again has a busy session before it . . . among judicial bones it has to pick is the Wagner-Connelly Labor Disputes Act . . . five cases involving this act of disputes are before the court . . . one which recently was appealed by the National Labor Relations Board relates to the Jones & Laughlin Steel Corp. case . . . the board lost the case before the Circuit Court of Appeals at New Orleans . . . this court held the act unconstitutional, as other courts have held the act . . . in the Jones & Laughlin case the Court of Appeals said application of the act was "beyond the power of Congress under the commerce clause of the constitution" . . .

CHANGING FROM STRAIGHT TO TAPER THREADS

"A MACHINE FOR COMPLETE COVERAGE OF ALL THREAD GRINDING NEEDS"



material. The machine will grind taps, tap and die chasers, circular chasers, button-type thread hobs, and thread hobs without lead.

And another feature—these jobs may be changed quickly and easily. Pitch changes are accomplished through change gears as quickly as on an engine lathe. The machine is adapted equally well to single piece or production work.

The J&L Thread Grinding Machine is a machine the industry has been waiting for. May we send further information? A new illustrated catalogue is yours for the asking.

JONES & LAMSON MACHINE CO.,

Springfield, Vt., U. S. A.

18 YEARS OF THREAD GRINDING EXPERIENCE

NO COMPENSATION FOR LEAD NEEDED AT ANY TIME

Imports of Shapes From Belgium

WASHINGTON, Oct. 6.—Imports of plain structural shapes during the January-July, 1936, period totaled 31,918 net tons valued at \$855,135. Of this total, 21,464 tons, valued at \$584,739, came from Belgium, while incoming shipments from France were 8174 tons, valued at \$200,470, and those from Germany amounted to 2089 tons, valued at \$64,451. Imports of fabricated shapes during the seven months' period were 224 tons. Under the Belgian-American reciprocal tariff agreement, the duty on fabricated shapes was reduced from 20 to 15 per cent ad valorem. Imports of steel sheet piling during the first seven months of the current year totaled 2318 tons.

Metal Directory Issued

ATLAS PUBLISHING CO., New York, has published the seventh edition of the Standard Metal Directory. The previous edition was published in 1931. The new directory, containing close to 700 pages of valuable information, lists blast furnaces, steel mills, foundries, smelters, manufacturers, etc., in the United States with a detailed report on each firm.

In addition there are special lists of ferrous and non-ferrous metal works, including sheet metal stamping plants, metal rolling mills, etc. Other information includes the names of manufacturers, dealers and importers and exporters of a large range of metal products.

August Exports of Scrap Showed Sustained Foreign Demand

WASHINGTON, Oct. 6.—The sustained foreign demand for scrap is indicated by the August movement, which rose approximately 1800 tons above that in July. Exports of old material in August were 199,649 gross tons, valued at \$2,565,635, an average of \$12.87 per ton, which is about \$1.80 over the average export value one year ago. This is in sharp contrast with the rapid rise in the domestic market.

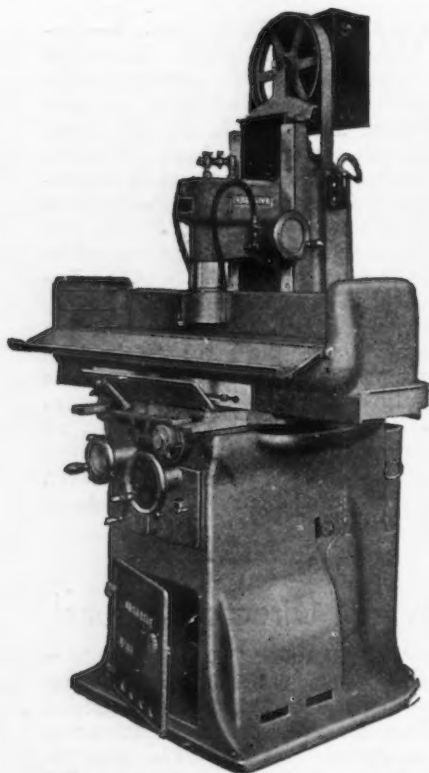
With THE IRON AGE scrap composite for No. 1 heavy melting steel standing at \$16.75 as of Sept. 29, there has been an upward swing of practically \$5 since August of last year. The export movement, of

course, covers all grades of scrap and its value consequently is not comparable with the quoted composite price which affects only one grade. But the figures do reflect a sharper rise in the domestic than in the export market. Should this trend continue it is the opinion generally that exports of scrap will be curtailed rather than increased. Obviously, however, if the foreign demand were so pressing as to stimulate prices proportionately to the rise in the domestic market it might be expected that outgoing shipments will continue to be high. This necessarily assumes availability and cost of gathering and shipping scrap for export.

August scrap exports made up the bulk of iron and steel exports as usual. Total shipments for the month were 278,378 tons, valued at \$8,839,428, compared with 296,738 tons, valued at \$9,624,566, exported in July. Exports of finished and semi-finished steel in August totaled 78,729 tons, valued at \$6,273,793. The largest finished line exported was tin plate, 14,641 tons, valued at \$1,482,792.

Exports during the eight months ended August of this year totaled 2,206,707 tons, valued at \$72,955,415, as against 2,136,781 tons, valued at \$58,593,554, in the corresponding period of last year. Shipments of old material during the eight-month period of the present year amounted to 1,474,389 tons and were 46,801 tons less than like shipments in the corresponding period of 1935. The 1936 movement emphasized the stiffening of prices, showing a value of \$18,080,938 against \$16,368,681. Exports of finished and semi-finished steel in the 1936 eight-month period totaled 723,318 tons, valued at \$54,874,457, compared to 615,591 tons, valued at \$42,224,875, in the corresponding period of last year.

The Chips Tell the Story!



Note the long curling chips, similar in all respects to ideal lathe turning in miniature. The material was 3 1/2% Nickel Steel, unannealed, 3 1/2" wide by 14" long. Table feed 12 ft. per minute. Vertical feed at each table reverse .00075". Wheel used, 3830-H Vitrified. A good example of what can be achieved through correct operation of our

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Write for Descriptive Bulletin.

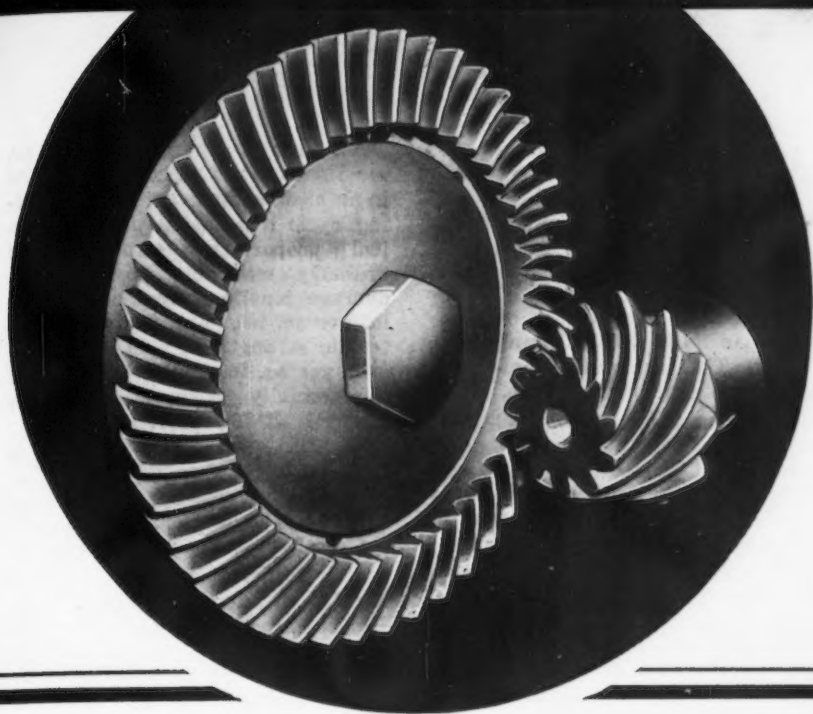
ABRASIVE MACHINE TOOL CO.
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Virginia Furnace Will Be Scrapped

THE last remaining blast furnace in Virginia of the Virginia Iron, Coal & Coke Co. has been sold, according to a recent announcement, and will be converted into scrap. Dismantling of the plant, which is located at Radford, Va., about 40 miles from Roanoke, will get under way this month. The purchaser is the Roanoke Scrap Iron & Metal Co., which expects to salvage approximately 5000 tons of iron and steel scrap.

Dismantling of the Virginia Iron, Coal & Coke Co.'s Dora furnace at Pulaski has already been undertaken. The sale of the Radford plant thus marks the extinction of the old type stacks in the state formerly operated by the company. This furnace had an annual capacity of 80,000 tons of foundry pig iron, and was last operated in 1919. It was one of the many which sprang up in the southwestern part of Virginia about 1890.

Virginia, once one of the most important pig iron producing districts in the United States, has been gradually forced out of this industry since the World War. During the war period there were 15 or more potentially active furnaces. From early colonial days 138 furnaces have been built in Virginia; of these 107 were charcoal stacks of the early days and 31 were coke furnaces.

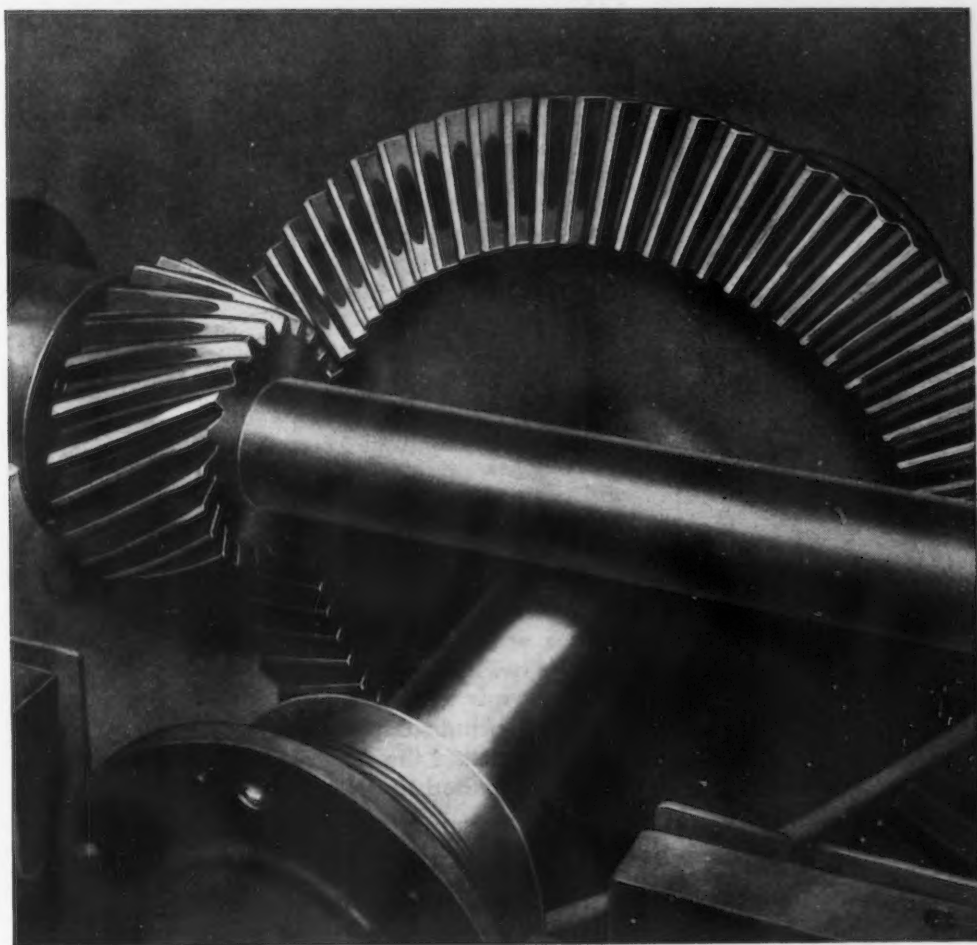


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Malleable Castings Market Growing Through Use of Pearlitic Iron

THE malleable iron industry has shown much interest recently in a pearlitic malleable iron and there is a steady growth in the use of this iron. The field for the malleables has been broadened by the manufacture of castings made of the pearlitic iron and 10 or more malleable foundries are now making this iron. Incidentally a valuable contribution to the literature on pearlitic malleable cast iron was recently issued, this being a comprehensive symposium on the subject prepared early in the year at a meeting of the Cleve-

land district committee of the American Society for Testing Materials. This symposium has now been put out in printed form.

The term pearlitic malleable iron has been adopted for the designation of materials cast as white cast iron and subsequently heat treated so as to retain significant amounts of combined carbon. The outstanding advantage of pearlitic malleable cast iron, which is being made in several types, is that a wide variation of physical properties may be attained by variations in the heat treatment.

The iron is usually melted in an air furnace and it is heat treated in an electric furnace. The annealing cycle depends upon the physical properties desired. While ordinary malleable iron has an average tensile strength of 54,000 lb. per sq. in., pearlitic iron has a tensile strength of 100,000 lb. or over per sq. in. and is being made commercially with a tensile strength of 80,000 lb.

The pearlitic malleable iron is being used for making castings that require strength but for which ductility is much less essential than strength. They are also used to advantage where hardness to resist wear is an important factor. They have a Brinell hardness of around 200 as compared with a Brinell hardness of 100 to 140 for ordinary malleable castings. Pearlitic malleable cast iron is being used for the manufacture of various parts requiring strength or hardness or both, some of which have not heretofore been made of malleable iron. In some cases the pearlitic malleable castings have replaced steel castings and less frequently they have replaced forgings. Products made of the pearlitic malleable iron include wrenches, gears, chain lugs and sprockets as well as quite a list of castings for other purposes.

A recently developed field for the malleable iron industry is the making of posts for highway guard rails and bridge standards. Malleable foundrymen are much interested in the recently publicized method of low temperature welding because if it proves successful it may be used for welding malleable castings, which is not done commercially with present welding methods owing to the high cost due to the necessity of reannealing the castings after welding.

France Bans Ore Exports to Germany

THE newspaper owned by Leon Blum, Premier of France, has announced that the French Government has prohibited the export of iron ore, of which Germany was taking large quantities from Lorraine. In the first seven months of this year, says *Le Populaire*, Lorraine exported 4,371,110 tons to Germany, the highest monthly quantity being 698,200 tons in June.

In reply to a deputy, the Finance Minister, M. Vincent-Auriol, stated in the French Chamber that the government had passed a decree prohibiting the export and re-export of iron ore. The only exceptions will be at the Minister's discretion.

GOOD BLANCHARD JOBS

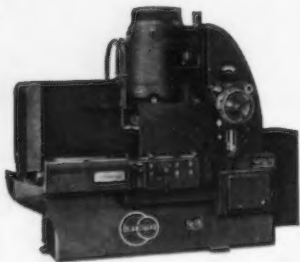


THE illustrations in the side panels show a few of many jobs now being done on Blanchard Grinders.

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CONVENTIONS

Oct. 5 to 10—Fourth Industrial Materials Exhibit, Hotel Roosevelt, New York. S. S. Kahn, Parker-Kalon Corp., 200 Varick Street, New York, secretary.

Oct. 8 to 10—Electrochemical Society, Hotel General Brock, Niagara Falls, Ont. Dr. Colin G. Fink, Columbia University, New York, secretary.

Oct. 15 to 17—Society of Automotive Engineers, first national aircraft production meeting at Ambassador Hotel, Los Angeles. John A. C. Warner, 29 West 39th Street, New York, general manager.

Oct. 16—Eastern States Blast Furnace and Coke Oven Association, meeting with Chicago District Blast Furnace and Coke Oven Association, Palmer House, Chicago. B. A. Standerline, Wisconsin Steel Co., Chicago, secretary, Chicago Association.

Oct. 18 to 22—American Institute of Mining and Metallurgical Engineers, Hotel Statler, Cleveland. Louis Jordan, 29 West 39th Street, New York, secretary.

Oct. 19 to 22—National Wholesale Hardware Association, Marlborough-Blenheim Hotel, Atlantic City. George A. Fernley, 505 Arch Street, Philadelphia, secretary.

Oct. 19 to 22—Wire Association, Hotel Cleveland, Cleveland. Richard E. Brown, 17 East 42nd Street, New York, secretary.

Oct. 19 to 23—American Society for Metals, Metal Congress and Exposition, Public Auditorium, Cleveland. W. H. Eisenman, 7016 Euclid Avenue, Cleveland, secretary.

Oct. 19 to 23—American Welding Society, Hotel Cleveland, Cleveland. M. M. Kelly, 33 West 39th Street, New York, secretary.

Oct. 19 to 23—American Gas Association, Auditorium, Atlantic City. Kurwin R. Boyes, 420 Lexington Avenue, New York, secretary.

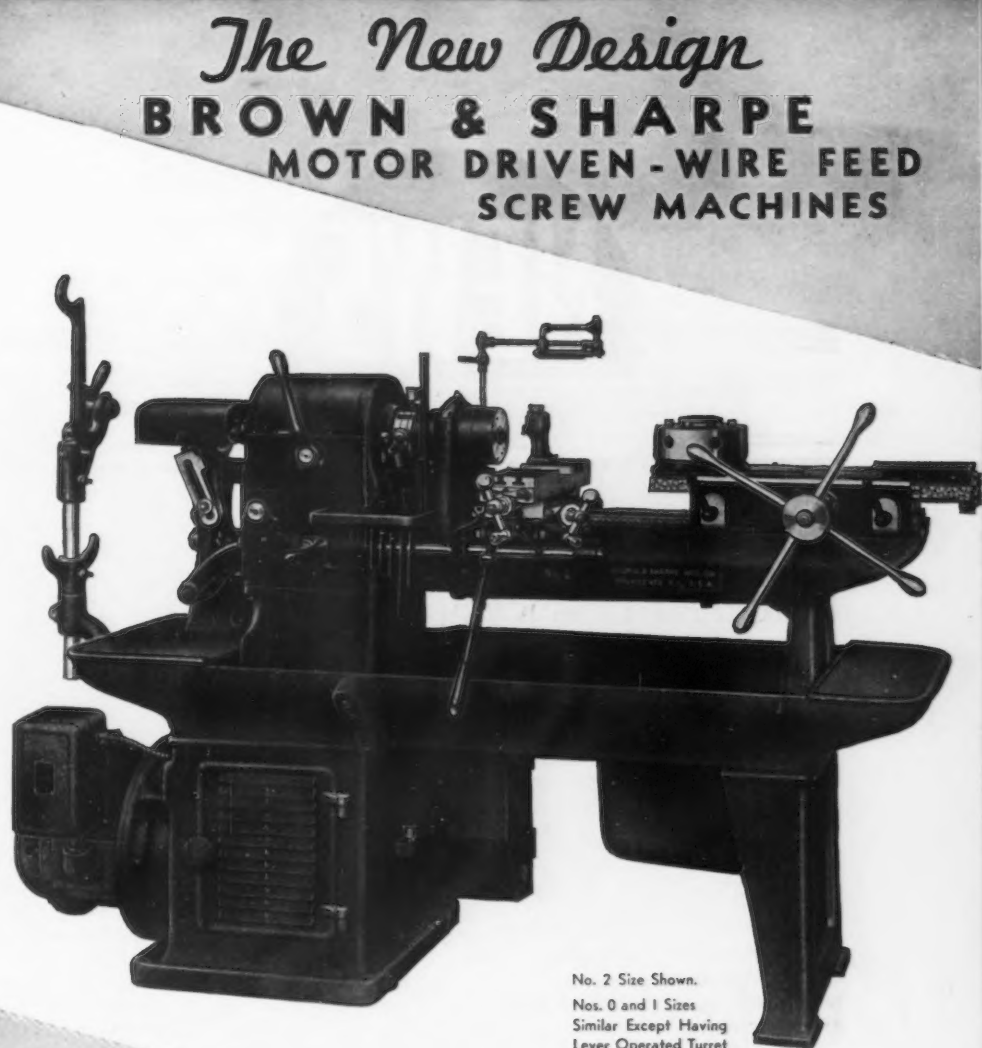
Oct. 20—National Association of Sheet Metal Distributors, Marlborough-Blenheim Hotel, Atlantic City. George A. Fernley, 505 Arch Street, Philadelphia, secretary.

Oct. 20 to 22—American Railway Bridge and Building Association, Stevens Hotel, Chicago. Annual convention and exhibit. C. A. Lichty, 319 North Waller Avenue, Chicago, secretary.

Oct. 20 to 22—Bridge and Building Supply Men's Association, Stevens Hotel, Chicago. W. S. Carlisle, 900 West 18th Street, Chicago, secretary.

Oct. 21 to 23—American Institute of Steel Construction, Greenbrier, White Sulphur Springs, W. Va. V. G. Iden, 200 Madison Avenue, New York, secretary.

Oct. 22 to 23—American Society of Mechanical Engineers, Fall meeting of iron and steel, machine shop practice and applied mechanics divisions,



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Hotel Cleveland, Cleveland. C. E. Davies, 29 West 39th Street, New York, secretary.

Oct. 27—Association of Consulting Chemists and Chemical Engineers, Chemists' Club, 52 East 41st Street, New York. Louis Weisberg, 50 East 41st Street, New York, secretary.

Oct. 30 to 31—Foundry Practice Conference, University of Iowa, Iowa City.

Nov. 18 to 19—National Founders' Association, Waldorf-Astoria Hotel, New York. J. M. Taylor, 29 South La Salle Street, Chicago, secretary.

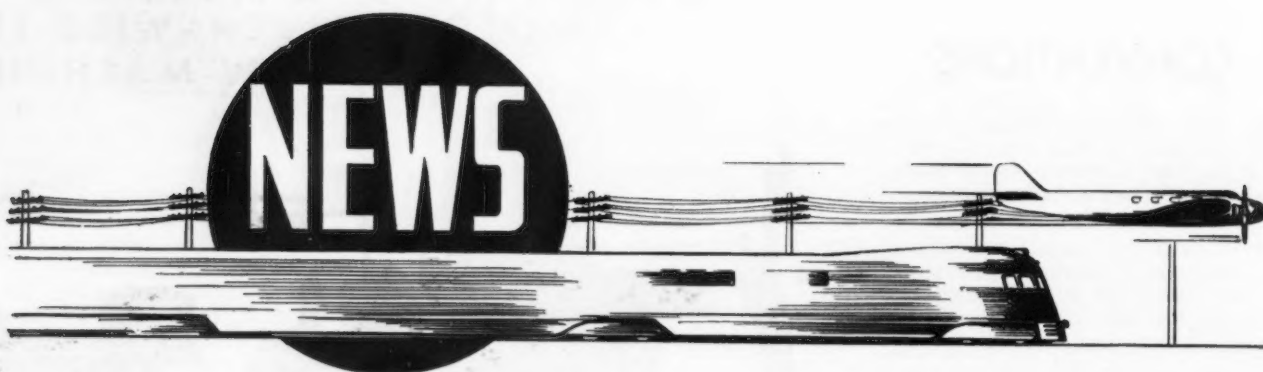
Nov. 18 to 20—National Foreign Trade Convention, Chicago. Lindsay Craw-

ford, 26 Beaver Street, New York, secretary.

Nov. 18 to 20—International Acetylene Association, Jefferson Hotel, St. Louis. Association headquarters, 30 West 42nd Street, New York.

Nov. 30 to Dec. 4—American Society of Mechanical Engineers, annual meeting, Engineering Societies Building, New York. C. E. Davies, 29 West 39th Street, New York, secretary.

Nov. 30 to Dec. 7—National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York. Charles F. Roth, International Exposition Co., manager.



Porcelain Enameling Industry Plans to Broaden Its Markets

INTENSIVE work in broadening the market for new enamel products is included in the program of the porcelain enamel industry for the coming year. This was brought out at a two-day meeting held at the Statler Hotel, Cleveland, Oct. 1 and 2, the first day being devoted to a sales conference of the porcelain enameling industry and the second to the sixth annual meeting of the Porcelain enamel Institute.

Promotional activities during the coming year will be centered to a considerable extent on the building field, which the porcelain enameling industry regards as one of the most promising fields for the further expansion of sales of its product. Special attention will be given to store fronts, as the industry feels that a very large market can be developed in the carrying out of modernization of stores.

Recommendations for extending the activities of the institute during the coming year were made by the president, R. G. Calton, Ten-

nessee Enamel Mfg. Co., Nashville, in his annual address. These included enlargement of the membership by taking in companies which are not confined exclusively to porcelain enamel work, such as refrigerator and stove manufacturers; an annual short course or open forum to be held in the spring at the Ohio State University and University of Illinois under the sponsorship of the institute for the benefit of men engaged in the enameling industry; two yearly meetings of the Institute, one in the spring and the second, an annual meeting, in the fall, and a national open house to be held during a week to be set aside by the entire industry for opening its plants to public school and college students and others interested in porcelain enamel.

The educational value to the public of holding an open house of this character was highly approved by Bennett Chapple, vice-president American Rolling Mill Co., who stated that a few days ago his com-

pany opened its plant for visitors and 13,000 people went through.

The members by vote endorsed the recommendations of the president outlined above and asked that they be placed in effect by the new board.

Declaring that business men as groups have given too little attention to social reforms, Mr. Calton urged that trade associations take up social security problems. It would be much better, he said, for the problems of social reforms to be worked out by business men rather than by politicians.

Expansion of Markets

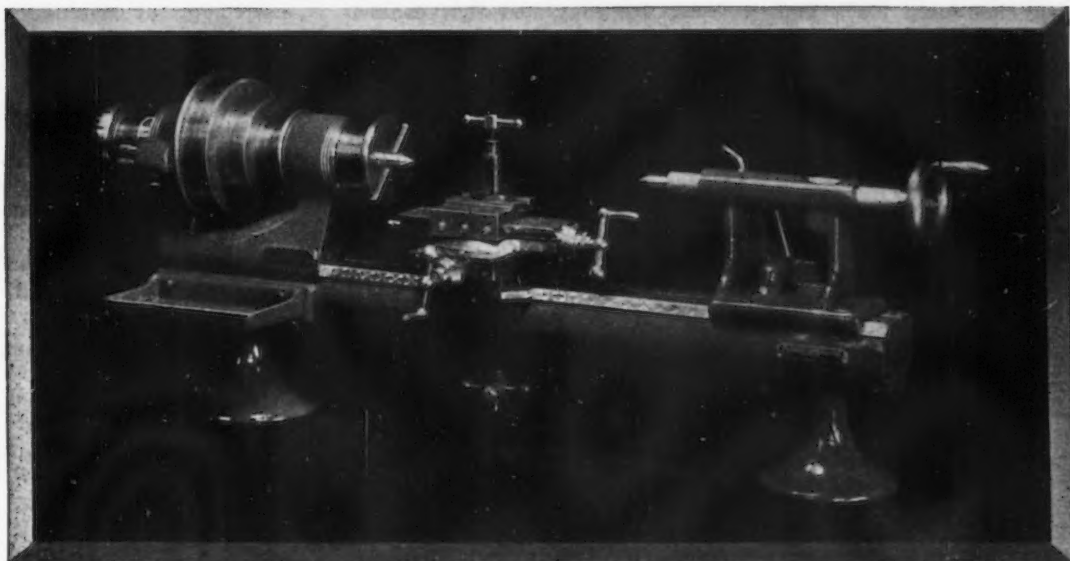
The use of porcelain enamel in the construction field was discussed at considerable length in an architectural forum presided over by Mr. Chapple and much interest was shown in developments in the field, which it is believed present unusual opportunities for the expansion of its product by the porcelain enamel industry.

All porcelain enameleers are doing some work in the building field, Mr. Chapple stated, but he pointed out that there has been no general clearing house of information by these manufacturers to bring to-

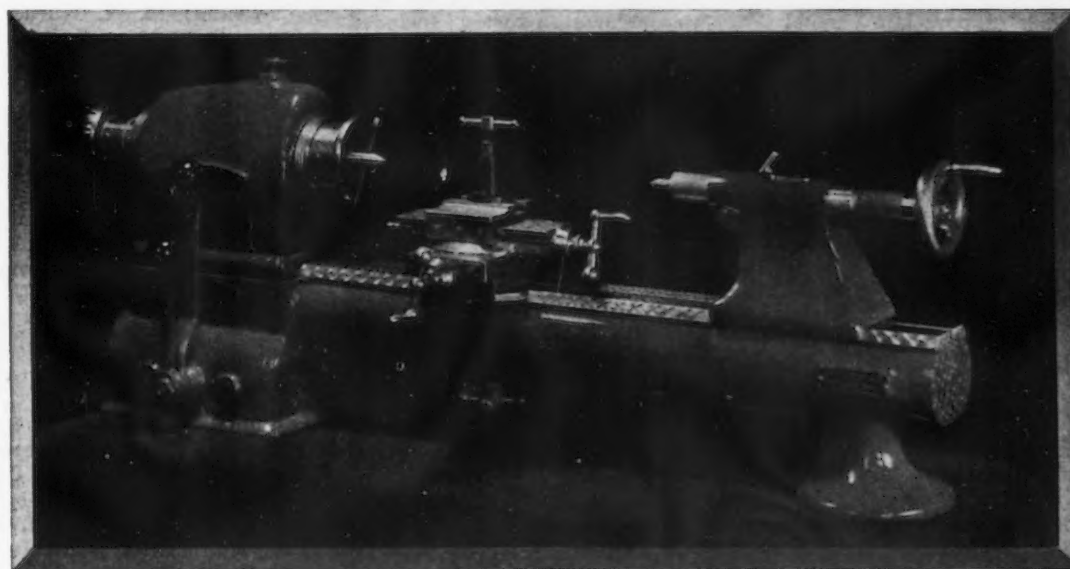
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gether the information as to what is being done.

William Hogenon, president, Chicago Vitreous Enamel Product Co., Cicero, Ill., declared that porcelain enamellers have been backward in providing attractive color effects for large surfaces and in bright lights. He mentioned that his company had used black and orange enamel in one filling station and the effect was "terrible." Recently the company had adopted new color shades for store fronts and theaters. Porcelain enamel, he claimed, is far superior to glass for this class of work. Designs can be provided that cannot be obtained in glass, he said, and irregularities in shape can be furnished that are not possible with the use of glass and ten times as many colors can be used as compared with glass.

The trend in porcelain enamel construction, said R. G. Calton, president of the institute, is toward having the job designed by men especially fitted for the work, and who would then supervise construction. In his opinion removable porcelain enamel panels, which formerly were thought necessary, are not now considered a real requisite.

A wide use of porcelain enamel for bathroom walls and the prefabrication of the material so that it can be installed in units to replace tile was predicted. The discussion brought out expressions of opinion that the use of porcelain enameling in the architectural field has grown so rapidly that architects do not know enough about its use and should not detail jobs

without consulting enamellers. It was suggested that the porcelain enamellers as a group should furnish architects with the information they should have about porcelain enameling construction.

The institute, Mr. Chapple believed, should be the headquarters for supplying information to architects. He suggested that enameling plants doing building construction work should send details and photographs of their work in that field and this could be combined to make a story of the progress of the porcelain enameling industry in the structural field. The technical research committee plans to develop a questionnaire which it will send out to porcelain enamellers in order to gather information that can be compiled into a handbook for architects.

Problems that confront the industry under the Robinson-Patman Act were discussed and an interpretation of this act was given by Ernest A. Gross, assistant counsel, National Association of Manufacturers. Rudolph W. Staud, Benjamin Electric Mfg. Co., Des Plaines, Ill., presided during this part of the discussion.

The sales conference of the porcelain enamel industry included presentation of reports by the divisions of the educational bureau, the function of which is to broaden the market for porcelain enamel finishes. Subjects discussed included technical research, educational work in the retail sales field, training of retail salesmen, developing new markets, product control problems and advertising. The

technical research committee is expanding its work in the architectural field. One of the subjects to which it is now giving attention relates to the improving of cast iron for enameling purposes.

New Officers

The present officers were re-elected for the ensuing year. They are: President, R. G. Calton, vice-president Tennessee Enamel Mfg. Co., Nashville; vice-presidents, F. E. Hodek, Jr., General Porcelain Enamel Mfg. Co., Chicago, and Emery Lasier, Titanium Alloys Mfg. Co., Niagara Falls, N. Y.; treasurer, William Hogenon, Chicago Vitreous Enamel Products Co., Cicero, Ill.

Trustees were elected for the following year as follows:

Frit Division: William Hogenon, R. A. Weaver, Ferro Enamel Corp., Cleveland; W. R. Greer, Porcelain Enamel & Mfg. Co., Baltimore; O. Hommel, O. Hommel & Co., Inc., Pittsburgh, and E. L. Lasier.

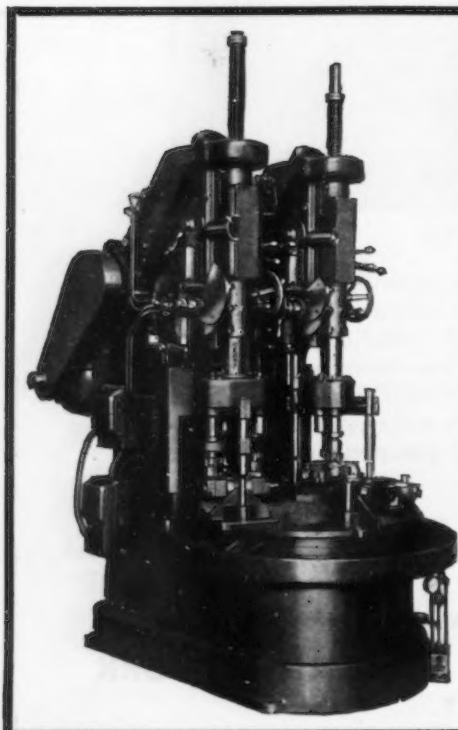
Table Top Division: R. G. Calton; R. W. Staud, Benjamin Electric Mfg. Co., Des Plaines, Ill.; W. H. Brett, Enamel Products Co., Cleveland; M. N. Hurd, Ingram-Richardson Mfg. Co. of Indiana, Frankfort, Ind.; and E. H. Weil, Vitreous Steel Products Co., Cleveland.

Jobbing Shop Division: F. S. Davidson, Davidson Enamel Products, Inc., Lima, Ohio; Earl S. Smith, Toledo Porcelain Enamel Products Co., Toledo; W. A. Donald, Vesco Sales Corp., New York; Gustav Oesterle, U. S. Porcelain Enamel Co., Los Angeles, and Louis Ingram, Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

Sign Division: George S. Blome, Baltimore Enamel & Novelty Co., Baltimore; F. E. Hodek, Jr.; J. T. Penton, California Metal Enameling Co., Los Angeles; M. J. Saltzman, Porcelain Metals, Inc., Long Island City, N. Y., and H. H. Wineburgh, Texlite, Inc., New York.

Cooperating Division: R. L. McGean, McGean Chemical Co., Cleveland; L. D. Mercer, Republic Steel Corp., Cleveland; Bennett Chapple, American Rolling Mill Co., Middletown, Ohio; F. S. Corrigan, General Steel Wares, Ltd., Toronto, Ont.; W. L. Lawson, Harshaw Chemical Co., Cleveland.

An executive committee composed of the following members, two representing each division, was chosen by the trustees: Frit Division, W. R. Greer and R. A. Weaver; Table Top Division, R. W. Staud and W. H. Brett; Jobbing Shop Division, Earl S. Smith and Louis Ingram; Cooperating Division, R. L. McGean and L. D. Mercer.



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Skilled Labor Ample at Pittsburgh But Cleveland Has an Acute Shortage

In THE IRON AGE of Oct. 1, page 45E, there appeared reports from various industries on the current situation in skilled labor supply and the efforts that are being taken to train men to increase the thinning ranks of the more highly skilled mechanics. Supplemental reports from the Pittsburgh and Cleveland areas are appended.

PITTSBURGH, Oct. 5.—Several months ago when steel production climbed upward, followed by extensive repairs and renovations in the plants, an apparent shortage of labor in the skilled classes existed. This was especially true in the following classifications: machinists, blacksmiths, pipe fitters, boiler makers, welders, roll turners and draftsmen. Many former employees had moved away or had obtained employment elsewhere and were not available. Others had died or had become pensioned. However, when workers in the plant heard of the need, they promptly got in touch with relatives and friends, with the result that employment offices were crowded day after day. Putting on non-skilled labor was an easy task, due to the unlimited supply which still exists. When it came to the skilled workers the problem was more difficult. The shortage was more in the nature of a slow process of interviewing and investigating references rather than a lack of candidates. Many men, desperate after long idleness, misrepresented their ability which in the long run prevented the speedy filling of requisitions for skilled help. At first, mills attempted to get the "cream of the crop," but as pressure grew for the services of craftsmen, the bars were let down a little as long as the applicant could furnish evidence that he could do the work required. During this period there was close to an acute shortage. However, by this time former employees who had been away and skilled men from other towns and locations, received news of the need for skilled labor, with the result that each day found acceptable candidates appearing at employment windows. All this took time and there is little doubt that projects and production were held up longer than would have been the case had skilled help been in abundance.

It is just within the last few weeks that mills and foundries in this district have reached a posi-

tion where there is no serious shortage. Mills and foundries in the city proper are in a better position to get skilled labor than those plants situated in nearby small towns and on the outskirts of the city. The conditions of transportation and housing play an important

part in the scarcity or non-scarcity of labor. Many men prefer to get work near their homes and do not want to settle down in a new town.

As a concrete example of the present situation, a few remarks concerning labor requirements gathered within the past few days from three employment managers of large plants in the district are quoted:

"Needed six machinists last week, and in the last 10 days these

For Cranks on the Subject of Cranks— ERIE Steam Drop Hammers



In the shops that turn out more crank shafts in a day than most shops do in a month, Erie Steam Drop Hammers, like the one illustrated, do the work. All of the "Big Three"—volume producers of automobiles—use Erie steam drops. All of them who forge crank shafts use hammers of this particular type, with rigid extended frame construction, heavy forged tie plate, quadruple-ported-valve cylinder. The hammers that have proven best for this tough job are best for your work.

A 12,000 lb. Erie steam drop recently installed by a prominent automobile manufacturer for forging six-throw crank shafts is shown in the illustration.

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men just have come around to the window to apply for work. Have men applying every day, but not skilled labor. If calls came, we would not be able to get men very easily. Do not consider shortage acute, though."

"Have some men applying every day for work. We could use some acetylene welders and a few first-class pipe fitters. Shortage noticed to a certain extent, but not acute."

"We are in need of two roll turners, two blacksmiths and a ma-

chinist. The lack of skilled labor is noticed very much. We consider it acute. However, men for other types of skilled labor are still applying. Just these three groups seem to be scarce."

Several other large steel plants are not in need of skilled labor at present. One large independent mill has an abundance, having taken applications for the last two years because of large scale improvements and construction.

Taking the district as a whole,

it could not be stated that there is an acute shortage of skilled help since each day employment managers are finding men to fill current requirements. There is enough justification, however, to call the present status of the labor picture, in case business revival reaches higher stages than at present, a *potential shortage of skilled labor*. As general business revives, not only will the steel mills and foundries need more help, but other industries curtailed for a long period will be in the market for additional workers.

There are several factors now present which will greatly tend to relieve any labor shortage in the future. The large steel producer in the Pittsburgh district has again resumed its program of apprenticeship training. This plan was discontinued during the depression owing to lack of need and scarcity of funds. The program lasts four years and takes employees or sons of employees through the various grades until the result is a first-class craftsman. Several men in each plant have been enrolled in the course and the number is expected to increase.

Another factor helping the present situation is the cooperation among plants within a company and between companies. For instance, a short time ago one large steel plant was in need of chippers while another mill had a surplus. With a few telephone calls the condition was promptly alleviated, and the shortage taken care of. Not only has this been done with chippers, but with all classes of skilled help.

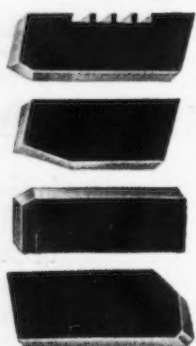
Schools Training Men

For several years the public schools in Pittsburgh have maintained vocational training schools with the cooperation of industry. As an example, a plant will take on two men. While one is at school for two weeks the other will be working in the plant. At the end of two weeks they exchange places, this procedure taking place until both have finished the course, at which time they are invariably taken on as full-time workers at the plant. All classes of labor are trained and the schools have elaborate workshops and equipment, the installation of which received the help and advice of industry.

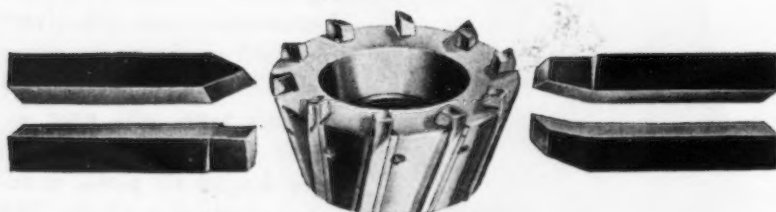
Many plants, especially steel companies, have been building new mills within the last few years. They have increased their working forces to a great extent. When these programs are finished, the experienced skilled workers are available to other plants. These men also constitute a reserve for the plant which originally hired and trained them. This method has

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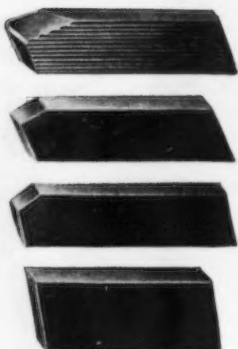


CROBALT is available in the form of both standard and special tools. Its low cost permits the use of solid tools instead of costly tipped types, particularly in the smaller sizes. For forming, CROBALT's high production per grind makes it an ideal cutting metal.



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H. E. Eaton Company

Pittsburgh, Pa. J. W. Mull, Jr.
Rockford, Ill. Motch & Merryweather Machinery Co.
San Francisco, Calif. E. R. Ekstrom
Seattle, Wash. H. E. Stallman
St. Louis, Mo. Frank P. Rogers
St. Paul, Minn. R. T. Monahan
Syracuse, N. Y. Robinson, Cary & Sands
Toledo, Ohio Roy W. Glahn
Tulsa, Okla. J. W. Mull, Jr.
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Station Type Machines "HOLEUNIT" Construction

- NATCO HOLEUNITs are flexible and interchangeable . . . are completely self-contained and no connections other than electrical are required. They represent the result of years of experience in building high production multiple head multiple spindle drilling, boring and tapping equipment . . . and they make possible the building of highly specialized machines for high production . . . yet they are standard in every respect.

- Equipped with a semi-automatic hydraulic feed, these NATCO HOLEUNITs will operate at any angle. They may be arranged in groups to perform all the required operations on a casting with a single handling. Should the part for which the units are arranged be altered or discontinued, it is only necessary to rearrange the units, equip them with new spindle boxes and the machine may be used for an entirely different piece of work.

- Illustrated at the right is a NATCO Station Type machine . . . distinctly a single purpose machine built to perform a total of 64 drilling, boring, chamfering, rough and finish reaming and milling operations on a cast iron cylinder block . . . yet the machine is built of standard NATCO HOLEUNITs . . . and may be altered as required with a minimum of expense.

- NATCO HOLEUNITs are built in a variety of sizes and capacities. Call, wire or write for a NATCO representative. Investigate these NATCO HOLEUNITs today.



Here is the **NATCO** *method*
of Building High Production Drilling, Boring
and Tapping Machines with **FLEXIBILITY**

- It's our business to lower your costs and increase your profits. Get a step ahead of competition and lower your costs now. NATCO Engineers will be glad to study your drilling, boring and tapping problems. Without any sort of obligation on your part we will make a careful survey and lay our recommendations before you . . . then you be the judge as to

whether they can save you money. Send in your prints or call a NATCO representative today.

- Chicago Office, 2009 Engineering Bldg., 205 West Wacker Drive; Detroit Office, 409 New Center Bldg. Factory and Home Offices, The National Automatic Tool Co., Richmond, Indiana, U. S. A.



NATCO

Drilling, Boring,
and Tapping Equipment

MURCHEY TYPE "C" COLLAPSIBLE TAP

SIZES:
1 1/4" to 12"



VISUALIZE
THE FOLLOWING FEATURES:

1. Chasers move in hardened slots.
2. Chasers collapse positively by cam and rollers.
3. Chasers quickly removed for grinding and quickly reset without removing cap.
4. Tap can be used for stationary and rotating tapping.

MURCHEY MACHINE & TOOL CO.,

951 Porter St.,
Detroit, Mich.

Collapsible Taps, Self-Opening Die Heads; Bolt Threading, Pipe Threading, and Pipe Cutting-Off Machinery

worked very satisfactorily in one plant in the district. Over a year ago a blooming mill was constructed and a short time after this, construction on a strip sheet mill was begun. Many of the skilled workmen who had worked on the blooming mill were available for the strip mill construction, and when this is completed there are many who will be employed permanently in the operation of the mill.

Another important factor assert-

ing itself in times like these is the discovery of workmen in the various plants who have capabilities not previously known by management. These men are promoted to better jobs because of their abilities, making room for less skilled workers.

Helping to some extent is the U. S. Employment Office in Pittsburgh, which during the last few years has specifically tagged all applicants as to their occupation and

experience. Many plants have used this service with good results. Although some applicants overestimate their abilities, the selection is much better than leafing through thousands of applications.

Summing the situation up, it appears that, although an acute shortage might materialize in case business experiences a sharp upward trend over present levels, the above described factors are and will continue to alleviate the shortages. Repeating again, the shortages that exist today are more a question of time than of supply since sooner or later the right man for the job comes along just when conditions appear serious.

Cleveland Shortage Acute

CLEVELAND, Oct. 5. — An acute shortage of skilled labor has existed in the Cleveland area for some time and there is little hope for relief as long as the metal-working industry maintains its present production rate. With industrial recovery there came an abnormal demand for skilled mechanics and the supply was below normal.

The scarcity is more pronounced in the machine tool industry than in other metal-working plants where there is a more general employment of machine operators that cannot be classed as skilled workers. In the machine tool field there is a scarcity of skilled mechanists, machine operators and machine assemblers. The shortage of machine operators is most pronounced in men fitted to operate such machines as horizontal and vertical boring mills, planers and large milling machines that require greater skill on the part of the operator than some of the simpler machines.

Die makers, die sinkers and tool makers have been so scarce for some time that it has been almost impossible to find men for these classes of work. However, there has been a slight easing up of the situation in this field in the past week or two because some men have drifted in from shops in the Detroit territory, which evidently are not as busy as they have been on automotive work. The supply of all-round machinists is reported to be a little better for the same reason, but this improvement is expected to be only temporary.

Machine tool manufacturers are giving serious consideration to the subject of replenishing their labor supply which in the wake of the depression began to prove inadequate.

Surveys of the National Industrial Conference Board and other agencies have brought out reasons for the shortage of skilled labor in

The SPINDLE'S the thing!

ALLOY STEEL - CARBON STEEL

FORGED and HOLLOW BORED for
Progressive Machine Tool Builders

AMERICAN HOLLOW BORING COMPANY 1912 RASPBERRY ST. ERIE, PA.

the metal-working field. Machine tool manufacturers in this territory attribute the inadequate supply largely to depletion of the ranks by death and old age and to the curtailment or complete abandonment of apprentice training courses in the plants of employers during the years of depression. Many craftsmen who because of age were near the border line of retirement for machine shop work when the depression forced them out of their jobs have not resumed their former calling as machinists. Others somewhat younger at the start of the depression, after a few workless years or being engaged in other activities, have suffered a loss both of skill and manual dexterity, so that they are no longer capable of doing efficient work in the machine shops.

One of the expedients adopted by the machine tool manufacturers in the emergency situation created by labor shortage is to transfer machine operators from one type of machine to another.

To Promote Apprentice Training

Cleveland is taking steps to meet the scarcity of skilled labor problem by the appointment by the Associated Industries, a large organization of employers, of a general committee on vocational training. This committee consists of Warner Seely, secretary Warner & Swasey Co., chairman; A. J. Sanford, Cleveland Hardware & Forging Co.; Charles Seelbach, Forest City Foundries Co.; Robert A. Reich, Pattern Engineering Co., and Franklin G. Smith, Osborn Mfg. Co.

This committee is endeavoring to promote apprentice training in the shops by impressing upon employers the importance of facing the labor-shortage problem that confronts them by training young men for work in the mechanical trades.

This committee will also promote the coordination of manual training in the public schools. It is now collecting data to show the probable needs of industry in newly trained young men in this area for an extended period in order to determine as nearly as possible how many trained machinists industry is likely to absorb in the next few years. The committee has not progressed far enough in its work to make a report on any phase of its activities.

There is a trend in the Cleveland district toward an extension of co-operative apprentice training. Under this plan industry works in co-operation with the manual training department of the public schools, the boys working part time as apprentices in the shops and spending the remainder of the time in

the schools in which they pursue textbook courses covering mathematics and other subjects that otherwise would have to be provided for them in apprentice training departments conducted in the shops.

Increased facilities for training both apprentices and adults were provided by the Cleveland Board of Education with the opening of the public schools this fall. The machine shop that had been operated at the Cleveland Trade School was removed to the East Technical High School and combined with the machinery equipment of that school. With the enlarged department there is room for 1000 students and the school is filled to capacity, the enrollment having increased over previous years.

Two Steel Companies Announce Merger

EFFECTIVE Oct. 1, Universal Steel Co. and Cyclops Steel Co. were merged to form the Universal-Cyclops Steel Corp. The Universal plant at Bridgeville, Pa., and the Cyclops plant at Titusville, Pa., will each continue to function as before. The management and policies of the former companies will be continued by the surviving corporation, with general offices at Bridgeville.

The merged companies had been closely associated in all of their activities for several years and this formal unification will further tend to improve the service of both divisions.

IT PAYS TO STANDARDIZE ON
STARRETT TOOLS

It pays in fewer rejects, in faster production, in lower costs. Write for the new revised edition of Starrett Catalog No. 25 "AA" and the Special Dial Indicator Catalog. Your distributor stocks Starrett Tools—buy through him.

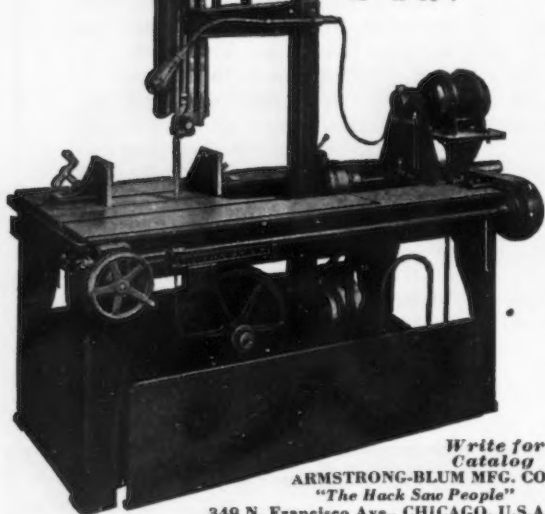
THE L. S. STARRETT CO.
World's Greatest Toolmakers
Manufacturers of Machine Tools
Steel Taps—Standard for America
ATHOL, MASS., U. S. A.

Use Starrett Tools



The Saw "With 100 Uses" ---- Universal

Usually the busiest machine tool in any shop because it's universal—handles all sizes and does all things well. **Straight Cutting.** Any stock from $\frac{1}{8}$ " x $\frac{1}{8}$ " to 18" x 18".



Write for
Catalog
ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
349 N. Francisco Ave., CHICAGO, U.S.A.

Notching, Coping. Blade does not change angle when cutting off straight or square. Permits notching, coping, slotting, shanking dies, jig work, etc., by making only 2 cuts.

Automatic Stop can be set for any required depth—with feed started at any point.

Power Feed or Hand Feed moves carriage and blade. Work always held stationary.

Cutting Angles with work flat on the bed it is possible to feed the blade into the work at any angle to 45° left or right. Example: to cut a perfect mitre simply swing the upright to 45° right or left.

In your shop, whatever your work, the MARVEL No. 8 would find "a hundred uses" on which it would cut costs.

recovery in structural steel is coming about through private activity rather than through Government aid because "the Government has been more concerned with providing wages for the unemployed than it has been to purchase the materials for them to work on.

"The volume of structural steel fabricated and erected in the United States during the first six month of 1936 has shown a comfortable increase over a like period of last year," the institute said. "Our industry reached the lowest point in sales in 1933. The gain in volume made in 1934 was barely sustained in 1935.

"It is interesting to note that whereas the volume of sales in 1936 is equal to the volume of sales made in the like period of 1931, the average price received for this steel in 1936 approximates the average price we received for like steel in 1931.

"Inasmuch as there are fewer shops today in existence because many of them have been closed through bankruptcy, liquidated by the depression, or dismantled, it would seem that had the economic law of supply and demand been in full operation prices today would be better than what they were in 1931.

"Such is not the case, probably because of the undue and unreasonable publicity given the question of wages, costs and prices as a result of our experiment with the National Industrial Recovery Act. There exists in the United States today a greater resistance to price recovery in the heavy industries than might otherwise be the case.

"The members of the American Institute of Steel Construction and the steel industry in general cooperated sincerely with the Government in its idea to regulate wages and prices. The industry is slowly reaching the conviction that such an effort was misdirected and that it definitely retarded recovery.

"Millions of dollars have been spent during the past three years to provide work for the unemployed, yet during those same three years even less was spent for construction materials to be used by such workmen than was spent for public works during the three years prior thereto. Public works today, in dollar volume, is far below the normal public works requirements of this country. This results in large degree from the fact that the Government has been more concerned with providing wages for the unemployed than it has been to purchase materials for them to work on."

Institute of Steel Construction Criticizes New Deal Relief Policy

THAT "orderly recovery is restrained by the extraordinary burdens imposed upon business by the relief activities of the Government" is the contention of the

American Institute of Steel Construction in a message addressed to the fifth international conference on steel development in Berlin. It is further contended that

GAMMONS TOOLS



SPIRAL SPECIALISTS

GAMMONS HOLMAN CO. MANCHESTER, CONN.

PRICE ! REDUCED.

CARBOLOY

Cemented Carbide for Tools and Blanks

**NOW
BASED
ON... 45¢ PER
GRAM**
IN ANY SIZE

PRODUCTION Executives! . . . You asked for a lower price! HERE IT IS! . . . Here is a drastic reduction which now enables you to apply Carboloy tools MORE FREELY throughout your plant!

Now you can get the full benefits of Carboloy savings on many of those "border-line" applications . . . applications on which the economical use of Carboloy was questionable due to the former high initial cost.

You now have the opportunity to really apply Carboloy tools extensively throughout your plant! Every production executive who knows the profitable advantages of Carboloy tools will immediately investigate their full possibilities at the new, low prices.

TYPICAL SAVING

Here is the old and new price of a Carboloy blank weighing 5 grams:

Old price \$4.50
New price . . . \$2.25

In addition to the reduction in the price of Carboloy itself, tool manufacturing labor is also reduced in quantities of 5 or over of any given tool.

Send the coupon below for revised price list on standard tools. Enclose blueprints of special tools for a prompt quotation without obligation.

CARBOLOY COMPANY, INC.
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new, low
price list**



*Now you
can use Carboloy
Tools more freely
throughout
your plant*

CARBOLOY CO., Inc., 2995 East Jefferson, Detroit
Without obligation, send us new, low price list on standard Carboloy tools.

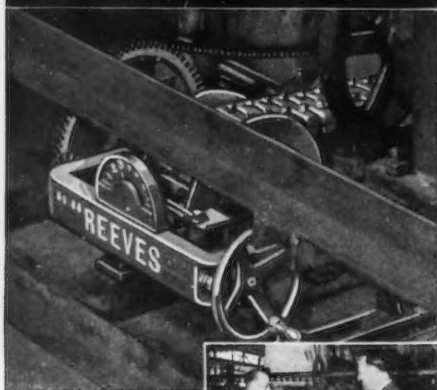
Name _____ Title _____

Company _____

City _____ State _____

☐ Furnish quotation on enclosed blueprint of special tool.

REEVES CONTROL HELPS PHILCO HIT 7 MILLION MARK



Typical application (enclosure removed) of REEVES Transmission on PHILCO conveyor. All assembly lines perfectly timed to attain desired volume and peak capacity.

Mayor Wilson, of Philadelphia, and L. E. Guob, president of Philco Radio & Television Corp., okay 7-millionth PHILCO as it comes off the line.



IN SPEAKING of their record of 7 million radio sets, PHILCO engineers say: "We want to give REEVES Transmissions credit for their important part in keeping our assembly lines perfectly timed and under instant control. With this efficient speed regulation, we have found necessary changeovers from one model to another a very simple matter."

Here is evidence of REEVES efficiency and dependability that plant executives can "get their teeth in." Not theories, but FACTS. REEVES Speed Control applied with eminent success in a plant where inaccurate, inflexible timing of production processes is *not* tolerated! REEVES engineers have the experience and the complete line of equipment to apply the speed control unit best suited to your needs. May we make a recommendation? No obligation . . . Write for REEVES Speed Control Handbook, I-36 describing time-tested methods for making any speed instantly available on any machine.



REEVES PULLEY CO., COLUMBUS, IND.

REEVES VARIABLE SPEED TRANSMISSIONS

..PERSONALS..

HERBERT A. BAKER, since 1932 vice-president in charge of sales of the American Can Co., New York, has been elected president of the company, succeeding C. E. GREEN, who has resigned. Dr. Baker has been identified with the company since his graduation from the University of Toronto in 1906. He was made chief chemist four years after entering the employ of the company and during the War served as chairman of the Tin Plate Apportionment committee, a division of the Food Administration at Washington. In 1918 he returned to the American Can Co. as sales manager in Chicago, where he remained until his election as vice-president in 1932. He was awarded the honorary degree of Doctor of Science by Colgate University in 1933 for his scientific contributions to the commercial canning of foods.

WALTER L. LOEGLER, who has been in charge for the past nine years of the Dayton territory for the Warner & Swasey Co., Cleveland, has been appointed manager of the Chicago office of the company. He has been associated with the company since 1912, when he went to work in the shops as an apprentice. He was transferred to the sales organization at Boston in 1919. Five years later he was named manager of the Philadelphia territory and in 1927 was transferred to Dayton. At Chi-

cago, he succeeds G. KOCHENDERFER, who has resigned.

ALBERT SCHNAITMAN, who joined the company in 1928 and who has recently been in the Dayton office, has been made manager at Dayton. He came to the United States from Germany in 1925 after four years of shop and engineering experience following his graduation from the technical high school at Stuttgart. Prior to his Warner & Swasey connection, Mr. Schnaitman was with the International Harvester Co. and with Chandler-Cleveland Motors Corp.

♦ ♦ ♦

A. W. STEUDEL, who has had a wide experience in practically all the operating and executive branches of the Sherwin-Williams Co., Cleveland, has been elected vice-president and general manager. H. D. WHITTLESEY, heretofore first vice-president and director of sales and distribution, will be relieved of his duties as director of sales and distribution to devote his entire time to executive duties. K. H. WOOD, for the past several years in charge of railway and marine sales, has been made director of sales and distribution for the company.

♦ ♦ ♦

C. A. LORD, formerly of the sales department of Concrete Steel Co., Chicago, has joined the general sales organization of the Universal Form Clamp Co., Chicago. Mr. Lord's place with Concrete Steel Co. has been filled by R. S. BROWN, who was formerly associated with his father in the firm of Smith & Brown, structural engineers, Chicago.

♦ ♦ ♦

LEON H. A. WEAVER, formerly publicity manager of the Super-



H. A. BAKER



W. L. LOEGLER



A. W. STEUDEL

heater Co., New York, has become identified with the sales and advertising department of the Green Fuel Economizer Co., Inc., Beacon, N. Y.

♦ ♦ ♦

H. J. KUMER of Montebello, Cal., has been appointed Pacific Coast representative of Hiram Swank's Sons, Inc., Johnstown, Pa. He was formerly with the Jones & Laughlin Steel Corp. and with the Warman Steel Casting Co., Los Angeles.

♦ ♦ ♦

ROY E. COLE has been appointed vice-president in charge of engineering of the Studebaker Corp., South Bend, Ind. Mr. Cole succeeds D. G. Roos, who resigned July 31. In 1924 Mr. Cole joined the Dodge Motor Co. as chief engineer. When Rockne Motors was formed by Studebaker in 1931, he became chief engineer for that or-



R. E. COLE



W. S. JAMES

ganization and returned to the parent company two years later. He has been active in the design of the company's products ever since.

WILLIAM S. JAMES has been named chief engineer of Studebaker. Mr. James' connection with the automobile industry also began in 1924, when he joined the research engineering department of Hupmobile. Later, he became assistant technologist for the Associated Oil Co. and went to Studebaker in 1926 as head of the research engineering department.

♦ ♦ ♦

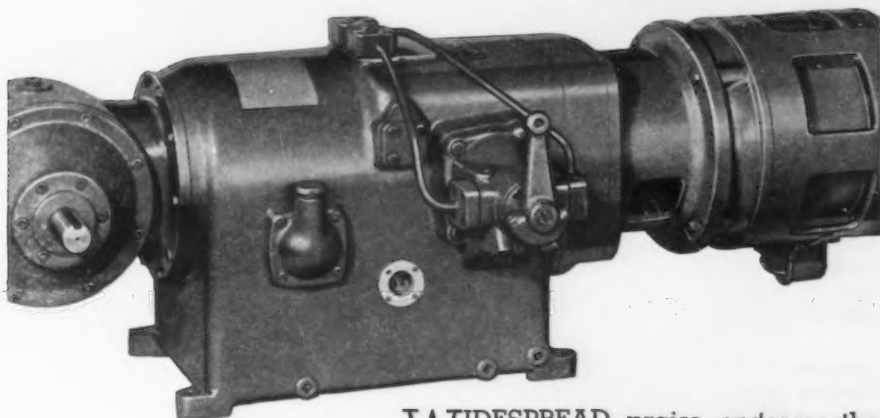
FRANK BURGAN, representing the

small tool division of the Ingersoll Milling Machine Co., Rockford, Ill., has also been assigned the northeast section of Ohio, succeeding Henry P. Boggis & Co., Cleveland.

♦ ♦ ♦

W. OFFERMANN, general manager of "Schumag," Aachen, Germany, maker of continuous rod making machines and rod straightening and polishing machines, has arrived in New York and will visit ferrous and non-ferrous rod

"THE FINEST WE HAVE EVER USED"



- ★ Smooth Acceleration and Deceleration
- ★ Accurate Stepless Speed Control . . . Minimum to Maximum in either direction
- ★ Automatic Load Indication and Overload Protection
- ★ Flexible Location with Hand, Automatic or Remote Control
- ★ High Efficiency, Low Maintenance
- ★ Smaller Size, Lower Cost

WIDESPREAD praise endorses the New Oilgear Fluid Power Variable Speed Transmission. Production men say its performance amazes them. It provides hairline accuracy of speed control; steplessly variable speed; even, positive speeds; smooth acceleration and reverse; a complete range of automatic and hand operation. The new simplified design makes Oilgear compact, widely adaptable and low in price. You will want full information about the transmission that is upsetting production figures in many lines. Bulletin 60000 sent free. THE OILGEAR COMPANY, 1311 W. Bruce St., Milwaukee, Wisc.



OILGEAR

Fluid Power

VARIABLE SPEED TRANSMISSIONS

mills. He will make his headquarters at the office of W. A. SCHUYLER, 230 West 57th Street, New York, the company's representative in this country.

♦ ♦ ♦

D. A. ROBERTS, formerly with the W. E. Mowry Co., St. Paul, has joined the staff of the Battelle Memorial Institute, Columbus, Ohio, in connection with metallurgical research.

♦ ♦ ♦

H. B. KRAUT, general manager of the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., sailed for Europe on Oct. 7.

♦ ♦ ♦

E. J. LUSTER, president, American Catalin Co., sailed for Europe

on Oct. 7 for a stay of several months.

♦ ♦ ♦

STEPHEN L. FEDUSKA, formerly identified with the Continental Roll & Steel Foundry Co., as assistant to the director of metallurgy, has joined the United Engineering & Foundry Co., Pittsburgh, in the capacity of metallurgist. He is a graduate of the University of Pittsburgh.

♦ ♦ ♦

A. P. WITTEMAN, for the past 10 years with the Falk Corp., Milwaukee, has joined the sales organization of the Leland-Gifford Co., Worcester. He is to be in charge of the Cleveland territory, with office at 2024 East 86th Street.

A. A. JAMIESON, for many years identified with the Westinghouse Electric & Mfg. Co. and more recently with the Carboly Co., has joined the sales force of William K. Stamets, Pittsburgh, to cover the Ohio territory.

♦ ♦ ♦

W. I. BROCKSON, for many years identified with the Steel Sales Corp., Chicago, has been elected vice-president of the Commercial Advertising Agency, Chicago. He is a past-president of the Engineering Advertisers' Association.

♦ ♦ ♦

RAYMOND E. ZAHNIZER has been appointed assistant manager of sales, tin mill products, of Jones & Laughlin Steel Corp. Mr. Zahnizer, who succeeds WILLIAM MILLER, recently appointed manager of sales, sheet and strip mill products, has been connected with the Jones & Laughlin New York district sales office for the past 10 years. He started with Jones & Laughlin Steel Corp. in 1912 in the order department and his entire business experience has been with the company.

♦ ♦ ♦

HAROLD L. DUBLIN has joined the Cleveland office of the Jones & Laughlin Steel Corp. to handle the sale of sheets and strip in that territory. He was district sales manager of Follansbee Brothers Co. at Cleveland and had been with that company for 24 years.

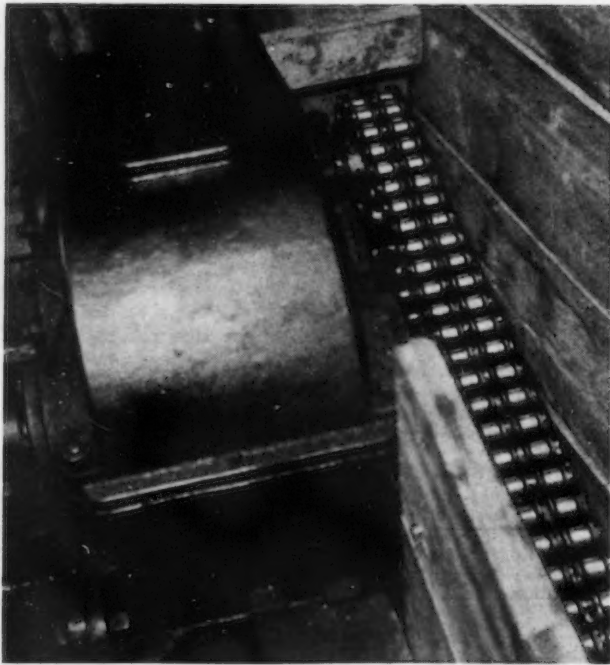
♦ ♦ ♦

HENRY D. SCOTT has been appointed executive assistant of the Wheeling Steel Corp., J. H. McELHINNEY has assumed the duties of assistant to the vice-president and GEORGE W. HEWITT has been made director of the raw materials division of the corporation. PARKER F. WILSON, heretofore assistant to the president, has resigned. Mr. Scott was identified with the operating department in an executive capacity until a few years ago, when he organized the Sharon Tube Co. Mr. McElhinney, before coming to the Wheeling company, was general superintendent of the Lukens Steel Co., Coatesville, Pa. The announcement of his resignation from the Lukens company was published in these columns Sept. 10.

H. H. Bell Steel Co., steel jobber, 52 Lait Street, New York, has purchased a five-story warehouse at 727 to 729 Washington Street, New York, which it will occupy after Jan. 1, when alterations will have been completed. Present space will be increased about one and a half times in the new location, and additional items will be added to the stock.

DIFFICULT DRIVES

ROLLER CHAIN For



*Courtesy of
Jones Lumber Co.,
Portland, Ore.*

● Install Baldwin-Duckworth roller chain on difficult, inaccessible drives—and then forget them. Here's one that has been in service for over 10 years—"and no one can recall that it has ever given any trouble."

This is not an unusual record for Baldwin-Duckworth installations. Roller chain provides that rugged power and endurance needed for "problem" drives—and Baldwin-Duckworth machine finished chain gives unusual economy regardless of strains and stresses.

The Baldwin-Duckworth line offers roller chain of all types and sizes and accurate cut tooth sprockets. For most satisfactory service use these two Baldwin-Duckworth products together. Send for copy of catalog. Baldwin-Duckworth Chain Corporation, Springfield, Mass.

BALDWIN-DUCKWORTH

...OBITUARY...

BARTON R. SHOVER, aged 68, died in Pittsburgh on Sept. 28. Mr. Shover was widely known as an iron and steel engineer and was actively engaged during his lifetime as a consultant by many steel companies in this country. In addition he was widely known abroad, having taken part in the building of the Tata Iron & Steel Co., Jamshedpur, India, and acting as consulting engineer for many of the projects now included in the Dominion Iron & Steel Corp., Sidney, Nova Scotia. He was born Feb. 12, 1868, at Dublin, Ind. He was graduated from Rose Polytechnic Institute of Terre Haute in 1890 and received an M.S. degree in 1895. In 1917 the degree of electrical engineer was conferred upon him by his college in recognition of his professional record. During his career he served as chief electrician for the Ohio Steel Co., Youngstown; electrical engineer for the Indiana Steel Co., Gary, Ind.; electrical engineer of Carnegie Steel Co., Youngstown district; general superintendent of the Brier Hill Steel Co., and general manager of the Tata Iron & Steel Co., Sakchi, India. Some time later he established offices in the Oliver Building, Pittsburgh, where he practiced as a consulting engineer. In January, 1926, he was engaged in consulting work on the plant of the Columbia Steel Co. of Butler, Pa., where the first wide strip was rolled in November, 1926.

♦ ♦ ♦
WILBERT H. EVERHART, assistant superintendent of the Corrigan, McKinney blast furnaces, Cleveland, of Republic Steel Corp., died of a heart attack Sept. 29, aged 63 years. He had been connected with the Corrigan, McKinney Steel Co. and its successor, the Republic Steel Corp., for 30 years. He served as superintendent of the Scottdale, Pa., blast furnace of the Corrigan, McKinney company and later was transferred to Cleveland as superintendent of the Cleveland, Scottdale and Genessee furnaces of that company. He severed his connection with the company about 10 years ago and three years ago returned to Cleveland as assistant superintendent of the Cleveland furnaces.

♦ ♦ ♦
HAROLD CORNELIUS SMITH, president, Illinois Tool Works, Chicago, died Sept. 29 of pneumonia

at the age of 54 years. His home was in Lake Forest, Ill. Mr. Smith was born Sept. 19, 1882, in Chicago and received his early education there. He was graduated from Princeton University in 1904. He became president of the Illinois Tool Works in 1915 after having spent several years with a brokerage firm. He was a director of the Northern Trust Co., Chicago, and a trustee for the Home for Incurables. Several times he was director of the Illinois Manufacturers' Association and of the

National Association of Manufacturers. He served on the Industrial Advisory Board of the NRA and was a member of the Business Advisory Board of the Department of Commerce from 1934 to 1935.

♦ ♦ ♦
EDWIN E. LINTHICUM, president of the National Cast Iron Pipe Co., Birmingham, died Sept. 30 from heart trouble after an illness of 10 days. Mr. Linthicum was born near Libertytown, Md.,
(CONTINUED ON PAGE 120)

FAST BRAKE RELEASE

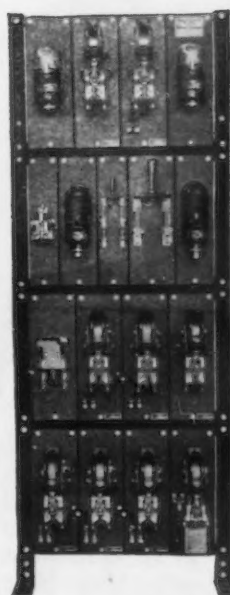
an exclusive feature of this EC&M Wright Dynamic Lowering Circuit Crane Hoist Controller

With this Crane Controller, the brake releases instantly. Instead of passing only a part of the line current through the brake on the first point lowering, the EC&M Wright Circuit is designed to allow all the current taken from the line to flow through the brake coil. The crane operator, no longer, need hesitate on the first step to give the brake an opportunity to release; instead, he can move his master controller immediately to any desired speed point. Improper brake adjustment has little effect on this quick release.

This improvement not only insures faster crane operation, but also provides greater accuracy and fewer movements when spotting heavy loads.

In addition to More Trips per Minute—the EC&M Bulletin 920 Wright Dynamic Lowering Circuit Controller permits a substantial reduction in power consumption, resulting in as much as a 30% saving in power consumed as compared with the previous type of dynamic lowering control.

For use in connection with this controller is the EC&M Bulletin 1182-1 Type NT Master Switch—sturdy, easily-operated, compact and of narrow width requiring a minimum space in the crane cab. Designed for upright or inverted mounting.



WRIGHT DYNAMIC LOWERING CIRCUIT CONTROLLER (WITH PROTECTION) FOR CRANES, HOISTS, ETC.



**Specify EC&M Crane Control
for Quick Brake Release and More
Trips per Minute with Less Power Consumption**

**The ELECTRIC CONTROLLER
and MFG. CO., CLEVELAND, OHIO**
**AUTOMATIC CONTROL for CRANES • MILL DRIVES and MACHINERY
BRAKES • LIMIT STOPS and LIFTING MAGNETS.**



Order Daytons and CUT COSTS

You make a double saving when you equip with Dayton Safety Ladders. Daytons pay for themselves not only in accident prevention, but in promoting faster and better work.

Made of durable airplane spruce — light, strong, easy to carry. Has folding step for extra height. Straight back permits close work. Sizes 3 to 16 feet. Moderately priced.

(Made in Cincinnati)

Write Dept. IA-10 for details

**THE DAYTON
SAFETY LADDER CO.**

121-123 West Third Street, CINCINNATI, O.

**DAYTON
Safety Ladder**

(Patented)

Stock carried on Pacific Coast by E. D. Bul-
lard Co., Los Angeles and San Francisco, and
by 160 other distributors from coast to coast.
Made and distributed in Canada by Safety
Supply Co., Toronto.

Pontiac Factory Busy After Four-Year Shutdown

(CONCLUDED FROM PAGE 61)

scale cars by special industrial trucks which take them to the bottom of the cupola hoist some 25 feet away. Here they are taken by electric hoist to the top of the cupola where they travel on a short overhead track to the mouth of the cupola. The average bucket load is from 1500 to 2000 lb. Melting ratio of mix to coke is $6\frac{1}{2}$ to 1.

At the present time one of the two cupolas is operating on soft iron and the other on hard iron or semi-steel. Cylinder blocks are hard iron or semi-steel. Cylinder heads and flywheels are 20 to 25 per cent semi-steel which is obtained by mixing soft and hard iron in the ladles in the proper proportions before pouring.

When the foundry starts work every morning, six preliminary charges go into the cupolas. Then a change is made in the formula of the next four preliminary charges, after which both cupolas are ready for their regular or permanent mix that continues on through the day.

The standard or regular soft iron cupola mix runs about as follows:

Steel	6.8 per cent
Foundry pig	3.5 " "
Malleable pig	43.0 " "
Briquettes of machine bor- ings	5.0 " "
Scrap—foreign	3.0 " "
Scrap—remelt	35.0 " "
K-16 (high silicon iron) ..	3.7 " "

The permanent hard iron or semi-steel cupola mix is as follows:

Steel	35.0 per cent
Foundry pig	11.0 " "
Malleable pig	12.2 " "
Briquettes	10.0 " "
Scrap—remelt	25.2 " "
KCN (Nickel, chromium and iron)	6.6 " "

These formulas are changed at any time to comply with the requirements of the hourly test bar analysis. Test bar analysis calls for a close check on the total carbon content; combined carbon; graphitic carbon; manganese; sulphur; phosphorus; silicon; nickel and chromium. Brinell tests for

hardness are made on the test bars as well as on actual motor blocks. Other laboratory observations on the hourly test bars include depth of chill; shrinkage per foot; transverse strength; tensile strength; deflection of test bar and the temperature at the spout of the cupola. Cylinder blocks are poured at 2700 deg. F.

Blocks are chipped, Brinelled, water-tested and gauged on a conveyor line in the cleaning room. Two tumblasts are provided for the cleaning of small, intricate castings that would be broken in the ordinary tumbler barrel. Pulleys, bearing caps and other small parts, go through the ordinary tumbling process and are transferred to a line with a rubber belt conveyor. In front of the line are grinding stands where the parts are ground, thrown on the rubber belt which takes them to the inspector, after which they are sorted out and sent to the machine shop.

The cleaning room is complete in every respect. A modern system for knocking out cores is employed. An efficient dust collecting system keeps the cleaning room free from dirt and metallic dust. A suction system and conveyor carry the dust off to settling tanks where it settles in water. The water is drained off, and used again, while the sludge is removed to an outside dumping ground.

A modern sand control laboratory is provided with the latest equipment. All molding sand is synthetic and is made in the foundry by adding clay, sea coal (finely ground coal) and betonite (fine clay) to sharp sand.

Core room equipment includes sixteen vertical ovens which make a revolution on an average of every $2\frac{1}{2}$ hours. They have capacity to take care of from 350 to 400 tons of castings per day. Also, there are three vertical ovens for drying motor jacket assemblies. An assembly line of eight girls and two men produces 48 eight-cylinder assemblies per hour.

There are automatic dipping tanks in which to dip barrel cores. All cores are ground to size with special gages and jigs. Barrel racks operating between core ovens and cleaners can be pushed or handled by electric lift trucks, thus making for a very flexible system.

Your Depreciation Rates Must Be Correct

(CONTINUED FROM PAGE 37)

including the percentage of the adjusted net income which the corporation felt it necessary to retain when making the dividend payments for the fiscal year in question and also the amount of depreciation claimed by the corporation which was subsequently not allowed by the Bureau of Internal Revenue. However, in view of the fact that under present regulations the Bureau is reducing depreciation charges wherever the taxpayer cannot show very conclusively that his claims are not excessive, and in view of the further facts that inadequate plant records and the very limited amount of replacement during the depression years make it very difficult for the average corporation to prove its claims for adequate depreciation charges, it would seem that there is a very real danger that many corporations will be assessed large additional normal taxes and surtaxes after their tax returns are audited.

The problem of protecting a corporation against this hazard is much more easily solved, at least in theory, although in practice it may not at first be at all easy to find the solution. It clearly would not be desirable to claim only such depreciation as would be certain to pass the scrutiny of the Bureau. To do so would simply mean that profits would be overstated by the amount of the depreciation which should have been charged and was not charged. It would further mean that the corporation would have to pay the normal tax on such apparent but unreal profits together with the surtax if these apparent profits were not distributed as a dividend. If these apparent profits were distributed as a dividend the capital of the corporation would be impaired to that extent. There is really only one way for a corporation to protect itself against this hazard. Depreciation charges must be adequate and the information upon which these charges are based must be sufficient to satisfy the Bureau of Internal Revenue that the depreciation claimed is not excessive. This will require in all cases that plant records be kept in such a manner that they really give a true picture

of the decrease in value through depreciation. It will also require in many cases that a rather definite replacement program be formulated and adhered to, and in some cases that a considerable part of present equipment be replaced during the next several years. The Bureau certainly will not permit a taxpayer to continue charging depreciation at a high rate, even though such a rate is proper from a purely eco-

nomie standpoint, unless the taxpayer is willing to replace equipment at the age which corresponds to the depreciation rate he claims.

Total depreciation claims amount to billions of dollars each year in this country, and there can be no doubt that total actual depreciation is at least as great as that claimed; also total depreciation is certainly increasing, due to the increasing rate of obsolescence.



PRETTY poor economy to make expert machine hands struggle with heavy loads! It tires workmen—takes too long—costs too much—slows up production of men and machines. The P & H Zip-Lift brings you a new and better method for floor-to-floor handling in machine shops—turns waste time into profit.

Production went up and costs went down when this Zip-Lift jib crane was set between two lathes. With simple push-buttons, operators handled heavy shafts on and off the chuck in less than half the time—saved an average of \$2.00 per day. The Zip-Lift paid for itself in 80 days.

Easier to install, to operate, to own—the Zip-Lift will save money at many points around your shop. Ask us for suggestions about "spot handling."

HARNISCHFEGER CORPORATION

ESTABLISHED 1884

4401 W. National Avenue, Milwaukee, Wis.



Zip-LIFT

**STOPS WASTE
WITH "SPOT HANDLING"**

Bonneville Sets the Stage for a Pacific Coast Iron Industry

(CONTINUED FROM PAGE 66)

The duties on manganese ores avowedly exist for the purpose of establishing trade agreements with foreign countries. It would appear that such an arrangement on

lumber, wheat and manganese ore would be of great mutual benefit. India and Chile are large importers of West Coast lumber and wheat and would welcome a balance of



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In our own warehouses, as well as those of our distributors, you will find thousands of bars and shapes in hundreds of classifications—each one ticketed with a complete record of its chemical and physical characteristics.

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Mills at Ambridge, Pa. and Chicago, Ill.

Manufacturers of Carbon and Alloy Steels

Turned and Polished Shafting Turned and Ground Shafting

trade induced by shipment of their manganese ore to the Lower Columbia River Valley.

The 1933 prices of Indian 48-50 per cent manganese ore ranged between 18 and 21c. per unit (22.4 lb.); of Chilean 47 per cent manganese ore, between 20 and 22.5c. and South Africa 52-54 per cent manganese ore, between 18 and 19c.

The above prices are all c.i.f. Atlantic sea ports. Deducting canal tolls, long ocean haul and adding preferential tariff arrangements and low return ballast cargo rates the delivery price at Portland should be lower than the eastern producers obtain. It is to be noted also that the eastern producers, generally have a long rail haul charge to pay in addition.

Indian manganese producers are well organized and already engaged in a world-wide trade. The ore is of high manganese content and free from objectionable impurities. There is now ballast and other cargo capacity, in excess of the 18,000 tons required, that return empty and carriers should offer a water rate lower than those obtainable on boats returning to Atlantic ports. For these reasons, Indian manganese ore is recommended for use at Bonneville. Ore of 48 to 50 per cent manganese should be delivered for 17c. a unit.

Summary of Costs

Assuming a consumption of iron ore of 1000 tons per day and other raw materials in proportion, the estimated costs are as follows:

Bessemer iron ores of 60 per cent metallic iron can be delivered to Bonneville at a cost of \$4.50 a ton or less.

Coke of 81 per cent fixed carbon should be delivered at Bonneville from the Wilkeson field, Wash., for \$6.50 a net ton.

Limestone flux of 98 per cent CaCO_3 and containing no injurious ingredients should be available at \$2.50 a ton or less.

Dolomite should be available in the raw state at \$3.75 a ton, and dead-burned in an electric furnace at \$7.50 a ton.

Magnesite from Chewelah, Stevens County, Wash., should be delivered to the Lower Columbia River Valley at \$7.00 a ton. The raw magnesite can be calcined in an electric furnace at \$2.00 per ton. Thus an ample supply of ex-

cellent refractory should be obtained at \$9.00 a ton.

Silica rock may be obtained from Denison, Wash., at \$4.00 a ton. Silica from foreign countries may be obtainable at a lower cost.

The best price at which fire clay can be obtained from southeastern Washington is \$6.00 a ton delivered. Foreign clay may be obtainable at a lower cost.

Chromite with 45 per cent Cr_2O_3 should be obtained for \$10 a ton, and manganese ore from India should average 17c. a lb., delivered.

The statements below are based upon the assumption that all pig iron or hot metal will be produced wholly from raw ores.

1.66 tons of iron ore, 60 per cent metallic iron at \$4.50 a ton....	= \$ 7.47
800 pounds coke, 81 per cent fixed carbon at \$6.50 a ton....	= 2.60
1000 pounds limestone, 98 per cent CaCO_3 at \$2.50 a ton....	= 1.25
Dolomite or magnesite	= 0.20
Chromite	= 0.06
Manganese	= 0.09

Total cost of raw materials per ton of pig iron	\$11.67
If charcoal or petroleum coke is used, the cost would be as a minimum	\$11.87

The costs on the basis of lesser consumption will rise well above the limits of economic feasibility except for special grades of iron.

Industrial Exhibit At Pittsburgh

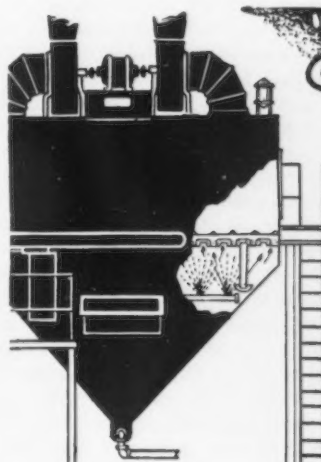
THE following companies will exhibit at the second annual industrial exhibit of the Pittsburgh Association of Purchasing Agents to be held Oct. 22 and 23 at the William Penn Hotel, Pittsburgh:

A list of exhibitors who have contracted for space follows:

Aluminum Co. of America.
American Rolling Mill Co.
American Spiral Spring & Mfg. Co.
Bankers Lithographing Co.
Bethlehem Steel Co.
Blaw-Knox Co.
Boston Woven Hose & Rubber Co.
Chandler-Boyd Supply Co.
Colonial Supply Co.
Copperweld Steel Co.
Dravo-Doyle Co.
Duff-Norton Mfg. Co.
B. K. Elliott Co.
Federated Metals Corp.
Fisher Scientific Co.
Frick Reid Supply Co.
General Chemical Co.
General Electric Supply Corp.
W. J. Gilmore Drug Co.
Graybar Electric Co.
Gulf Oil Corp.
Harris Pump & Supply Co.
Heppenstall Co.
Hetzel Steel Form & Iron Co.
Hewitt Rubber Co.
Homestead Valve Co.
C. G. Hussey & Co.

Jones & Laughlin Steel Corp.
Koppers Co.
F. J. Kress Box Co.
Latrobe Electric Steel Co.
W. W. Lawrence Co.
Lowman Shields Rubber Co.
Mathews Conveyor Co.
Mesta Machine Co.
Mine Safety Appliance Co.
McKay Company
National Bearing Metals Co.
Oliver Iron & Steel Co.
William M. Orr Co.
Pennsylvania Electrical Repair Co.
Phillips Mine & Mill Supply Co.
Pittsburgh Coal Company
Pittsburgh Equitable Meter Co.
Pittsburgh Gear & Machine Co.
Pittsburgh Gage & Supply Co.
Pittsburgh Piping & Equipment Co.

Pittsburgh Screw & Bolt Corp.
Pittsburgh Steel Co.
Pittsburgh Steel Foundry Co.
Railway & Industrial Engineering Co.
Republic Rubber Co.
Somers, Fittler & Todd Co.
Standard Machinists' Supply Co.
Stevenson & Foster Co.
Thompson & Co.
United Engineering & Foundry Co.
Vanadium Alloys Steel Co.
Vanadium Co. of America
Arthur Von Senden Co.
Walworth Co.
Edgar T. Ward's Sons Co.
Westinghouse Airbrake Co.
Westinghouse Electric & Mfg. Co.
Edwin L. Wiegand Co.
Joseph Woodwell Co.



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DUST COLLECTORS

*no moving parts
no wear
no repairs*

TROUBLE-FREE operation is assured. Dust-laden air is drawn to the distributing chamber—passed upward through "bubble-caps" (see insert) and successive layers of water and a frothing agent that trap both the large and fine dust particles.

High efficiencies are secured. No manual supervision is required. No replacement of filtering units. No fire hazard. Lowest operating costs. Full details and descriptive literature sent on request.



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Elevators
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Ash Handling Sys-
tems for Boiler Plants
•
Chains, Sprockets,
Buckets
•
Dust Collectors
•
Skip Hoists
•
Foundry Sand
Handling Equipment

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Dust Collectors

CONVEYORS • ELEVATORS • HAND WINCHES • SKIP HOISTS • CHAINS
SPROCKETS • BEARINGS • TAKE-UPS • DUST COLLECTORS

Carnegie-Illinois Employees

Propose a "Bargaining Committee"

HAVING been shunted to the background by activities of the so-called company unions, the Steel Workers' Organizing Committee emerged long enough last week to publicly claim credit for the militant action on the part of employee representatives in asking for wage increases and changed working conditions.

In direct contradiction to their contention, however, was the blast against the SWOC let loose recently by the Carnegie-Illinois Homestead, Pa., works committee representing 10,000 employees. The statement, which accused the SWOC of trying to take credit for successes of the employee representatives, appeared in part in THE IRON AGE of Oct. 1. This same committee a day later informed Benjamin F. Fairless, president of the Carnegie-Illinois Steel Corp., that unless a wage increase was granted by Oct. 15 the issue would be thrown into arbitration.

Another development further overshadowing SWOC activities was a move by Carnegie-Illinois employee representatives to have the representation plan revised so as to permit the establishment of a small bargaining committee. This committee, to be known as the Pittsburgh District General Council, would consist of two employee representatives from each Carnegie-Illinois plant. A similar group now exists but is not recognized by the management and the present request is for formal recognition through revision of the representation plan. If successful, it will give the council wide powers in negotiating wage and working condition issues.

In presenting the suggested revisions, F. W. Bohne, chairman of the Youngstown representatives, warned that failure to increase wages and permit changes in the representation plan "threatens the peaceful relations" between management and the men. The same committee, requesting changes in the plan of employee representation, also asked the Carnegie-Illinois management to make some immediate decisions regarding a wage increase. They declared that "... the outside influence against our plan would be curtailed by such action on the part of the company and the representation plan would be benefited thereby for the reason

that the C.I.O. (Lewis group) has made a political issue of this wage question. We believe that a settlement of it before the election would counteract much of their propaganda."

Accompanying the request for revision of the plan were several pertinent remarks indicative of the workers' feelings towards "outside" groups. According to the chairman of the representatives "... it is imperative that we must carry out these recommendations to counteract the subversive influences of the enemies to our representation plan and as a check to the growing discontent among the employees that is being fed by propaganda of hate for our so-called company unions. The company must do this as a matter of justice and in its own interest. . . . The representatives and the employees are, as a whole, loyal and deserve the utmost sympathy and the greatest help in their efforts to keep aloof from outside influences."

Objects to Being Branded as "Tool of Management"

The committee submitting the foregoing thoughts represents thousands of Carnegie-Illinois employees and its statement indicates the aversion it has to being branded as "a tool of management" by the SWOC. This committee feels so strongly against Lewis and his group that it recently recalled two members, as representatives, who had aligned themselves with the SWOC.

No official statement as to the number of steel workers enrolled by the SWOC has been released. The closest to this, was a statement that "135,000 application blanks have been printed." It has been admitted that dues and initiation fees have been waived in some cases and that the money received from these two sources has been insufficient to pay for the organization drive to date. Some observers feel that the SWOC made their greatest blunder in trying to give the impression that the so-called company unions are completely dominated by management. The workmen deeply resent this and point to their recent statements regarding wage increases and working conditions.

Adding to the current employee

representation activity will be a meeting of Carnegie-Illinois representatives called for Oct. 18 by a group of pro-Lewis Duquesne works representatives. Attendance at this meeting might indicate the extent to which Lewis has reached the employee representatives. It has never been explained how a pro-Lewis employee representative can put his constituents on record for the SWOC when he has been elected under the representation plan to deal only with the management of the steel company on behalf of the employees. Any elaborate attempts to "capture" employee representatives can have but one purpose—publicity.

Koppers Interests Will Change Names

IN connection with a forthcoming refunding program, involving financing of between \$25,000,000 and \$30,000,000, Koppers Gas & Coke Co. has changed its name to Koppers Co. The Koppers Co. of Delaware will be known as Koppers Associates, Inc., and the top unit in the Koppers group, the Koppers Co. of Massachusetts, will hereafter be known as Koppers United Co.

A registration statement is expected to be filed with the Securities Exchange Commission in Washington shortly. The Koppers Construction Co., a subsidiary of Koppers Gas & Coke Co., will be dissolved and made a division of the new Koppers Co. Likewise the Bartlett Hayward Co. and the Maryland Drydock Co., subsidiaries of the Koppers Construction Co., will be dissolved.

General Electric Orders Increase

ORDERS received by the General Electric Co. during the third quarter of 1936 amounted to \$74,922,441, compared with \$54,400,819 during the third quarter of 1935, an increase of 38 per cent, it was announced by President Gerard Swope.

Orders received during the nine months amounted to \$211,891,038, compared with \$158,943,765 during the nine months last year, an increase of 33 per cent.

Orders received during the third quarter and first nine months of this year were larger than for any respective period since 1930.

Steel Ingot Production Declines Slightly in September

PRODUCTION of Bessemer and open-hearth steel ingots in September totaled 4,161,108 gross tons, a drop of 34,022 tons from August, according to the American Iron and Steel Institute. The loss in tonnage resulted from a decrease in the amount of Bessemer ingots produced, since in open-hearth steel there was a slight increase. The 4,161,108-ton total for September indicated a daily rate of production of 160,043 tons and operations at 72.92 per cent of capacity. During August 161,351 tons was turned out daily, while operations were at 73.52 per cent of capacity.

The September volume, however, was greater than for any other month this year except August and contrasts with but 2,825,004 tons' output in the corresponding month last year. This represents a gain of 1,336,104 tons, or better than 47 per cent. For the first nine months this year production of 33,-605,304 gross tons of Bessemer and

open-hearth steel ingots compares with last year's corresponding figure of 24,051,412 tons, an increase of about 40 per cent.

Railroad Buying Up Sharply this Year

STATISTICS published by *Railway Age* show that purchases of materials and supplies, exclusive of fuel, from manufacturers and orders placed with manufacturers for locomotives and cars in the first eight months of this year, exceeded by 61 per cent the buying for the corresponding period of 1935. Also this year's totals are larger by \$83,000,000, or 22 per cent, than the corresponding periods of 1932 and 1933 combined, while the buying in the first eight months of 1931 was \$65,000,000 or 18 per cent less than that of 1936.

"However," says the magazine, "the total business placed with

manufacturers up to Sept. 1, this year, as reflected by the above totals, was 52 per cent less than the corresponding business placed with manufacturers during the first eight months of 1929.

"The value of orders placed with equipment builders for new locomotives and cars during the first eight months of this year, amounting to \$88,987,000, fell well below the corresponding figures for 1929 and 1930, but was almost four times the value of orders placed in the first eight months of 1935. In fact, it exceeded by \$5,000,000 the totals for the eight months' periods of 1934 and 1935 combined, and came within \$24,000,000 of equaling the totals for the first eight months of all the previous five years combined."

Rail purchases increased \$14,-000,000 or 100 per cent over the 1935 purchases, while orders of repair parts for locomotives and cars increased \$83,000,000 or 40 per cent.

Walsh-Healey Act Appointments Made

WASHINGTON, Oct. 6.—Headed by Frank Healey of the office of solicitor in the Department of Labor, Secretary of Labor Perkins today named a temporary board of three under the Walsh-Healey Government Contracts' Act. The law went into effect Sept. 28. The other two members of the board are Hugh L. Kerwin, director of conciliation, Department of Labor, and Telfair Knight, counsel for the Textile Labor Relations Board Division. The board members will serve until special appropriation is made by Congress to administer the act.

The board will pass on requests of contractors for exemptions and exceptions, establish overtime rates of pay, hear complaints of alleged violations of the act, fix minimum wages and hear appeals from rulings of other Government agencies. An advisory council later will be named to assist the board. Miss Perkins estimated that holders of approximately \$380,000,000 in Government contracts are affected by the act.

Pittsburgh Steel Co. for the fiscal year ended June 30, showed a net loss of \$265,359 against a net loss of \$1,765,906 in the previous fiscal year. The company has broken down the result of its operation in its two halves and shows that whereas there was a net loss of \$516,067 in the first six months of the past fiscal year, there was a net profit of \$250,708 in the second half.

REPORTED BY COMPANIES WHICH IN 1934 MADE 97.91 PER CENT OF THE OPEN-HEARTH AND 100 PER CENT OF THE BESSEMER INGOT PRODUCTION

1934	Reported Production (Gross Tons)		Calculated Monthly Production All Companies		Number of Working Days	Per Cent of Opera- tion
	Open-Hearth	Bessemer	Monthly	Daily		
January	1,786,458	172,489	1,997,129	73,968	27	33.59
February	1,993,465	175,873	2,211,944	92,164	24	41.86
March	2,540,243	203,904	2,798,440	103,646	27	47.07
April	2,622,531	257,482	2,936,064	117,443	25	53.34
May	3,003,676	331,620	3,399,494	125,907	27	57.18
June	2,718,782	282,592	3,059,483	117,672	26	53.44
July	1,340,924	119,869	1,489,453	59,578	25	27.06
August	1,245,139	109,598	1,381,350	51,161	27	23.24
September	1,127,269	117,615	1,268,977	50,759	25	23.05
October	1,325,777	127,789	1,481,902	54,885	27	24.93
November	1,447,626	132,059	1,610,625	61,947	26	28.13
December	1,794,437	131,467	1,964,257	78,570	25	35.68
Total	22,946,327	2,162,357	25,599,118	83,312	311	37.38
1935						
January	2,578,531	239,858	2,870,161	106,302	27	48.02
February	2,499,744	224,336	2,774,271	115,595	24	52.22
March	2,582,628	230,810	2,865,292	110,204	26	59.78
April	2,361,275	231,916	2,640,602	101,562	26	45.88
May	2,332,042	254,796	2,633,661	97,543	27	44.06
June	2,007,862	210,487	2,258,664	90,347	25	40.81
July	2,003,151	224,456	2,267,827	87,224	26	39.40
August	2,629,768	233,361	2,915,930	107,997	27	48.78
September	2,540,264	233,737	2,825,004	113,000	25	51.04
October	2,815,510	270,719	3,142,759	116,398	27	52.58
November	2,841,199	252,163	3,150,409	121,170	26	54.73
December	2,789,015	228,392	3,073,405	122,936	25	55.53
Total	29,980,989	2,835,031	33,417,985	107,453	311	48.54
1936						
January	2,793,421	196,389	3,045,946	112,813	27	51.40
February	2,707,562	202,445	2,964,418	118,577	25	54.03
March	3,095,375	185,040	3,342,619	128,562	26	58.58
April	3,565,821	304,775	3,942,254	151,625	26	69.09
May	3,670,401	302,092	4,046,253	155,625	26	70.91
June	3,578,044	334,897	3,984,845	153,263	26	69.83
July	3,525,281	326,606	3,922,731	150,874	26	68.74
August	3,768,832	350,560	4,195,130	161,351	26	73.52
September	3,782,056	303,048	4,161,108	160,043	26	72.92
3rd Quarter	11,076,169	980,214	12,278,969	157,423	78	71.73

Clayton R. Burt Elected President Of Machine Tool Builders Ass'n

HOT SPRINGS, Va., Oct. 6.—Clayton R. Burt, president, Pratt & Whitney Co., Hartford, Conn., was elected president of the National Machine Tool Builders Association at the thirty-fifth annual convention held at the Homestead, Hot Springs, Va., Oct. 5-7.

H. W. Dunbar, manager grinding machine division, Norton Co., Worcester, Mass., was elected first vice-president and N. A. Woodworth, president, Ex-Cell-O Aircraft & Tool Corp., Detroit, is second vice-president; H. C. Pierle, secretary; R. K. LeBlond, Machine Tool Co., Cincinnati, continues as treasurer.

New directors include Albert J. Gifford, treasurer, Leland Gifford Co., Worcester, and T. H. Doan, president, Foote-Burt Co., Cleveland.

Speakers at the opening session

on Oct. 5, included President Norman D. MacLeod, who is president of Abrasive Machine Tool Co., East Providence, R. I.; H. H. Lind, general manager of the association, and Prof. Erwin Schell, head of the Business Administration Department, Massachusetts Institute of Technology, Prof. Schell speaking on "security versus opportunity."

Experiences and impressions relating to export markets with particular reference to machine tools were outlined in three highly interesting addresses by F. H. Chapin, president, National Acme Co., Cleveland, who spoke on Germany; S. T. Massey, vice-president, Heald Machine Co., on Italy and J. E. Lovely, chief engineer, Jones & Lamson Machine Co., on Great Britain.

Further details of the meeting will be included in our next issue.

into a central section small enough to ride on a transport trailer. Thus it may be taken to a desired site, unloaded onto a concrete foundation, expanded, joints sealed and insulated, pipes and wires connected and furniture moved in.

It is also possible to fold up the house again, load it onto a trailer and move to a new location. Designed to sell for \$3,000, it will also be possible, when a new design home is desired, to trade in the old house for a new one. The old structure can be reconditioned and sold as used, exactly as is the case with second-hand automobiles.

Measuring 37½ ft. x 27½ ft., the house contains a living room, kitchen, utility room, bath and two bedrooms. It is equipped with an air conditioning and heating unit, all kitchen and bath room facilities, four folding beds and two dressers. The interior is decorated at the factory to suit the individual.



...GREAT BRITAIN...

... Industry operating at full capacity.

... Delivery delays still a serious problem.

... Currency devaluations of slight effect.

LONDON, ENGLAND, Oct. 6. (By Cable).—Although the British iron and steel works are operating at full capacity, complaints regarding delivery delays are frequent and more orders would be placed but for the inability of mills to execute them.

Pig iron consumers are being strictly rationed and are receiving only the most urgent requirements.

The supply of semi-finished steel is easier owing to large imports from the Continent and the restarting of idle British plants. Still large imports are being arranged for under a new licensing system, now under consideration, which would provide for admission of a specified tonnage from cartel countries at reduced tariff rates and an extension of British rebates to purchasers of cartel steel.

Demand for finished steel is still broadening. Tin plate is quieter following recent heavy purchases and owing to trade dislocation after recent currency events, but all mills are comfortably situated as to orders on hand.

Gulf States Steel Co. Sues to Test Alabama Unemployment Compensation

THE legality of the Alabama unemployment compensation law was attacked last week in the U. S. District Court at Montgomery, Ala., by the Gulf States Steel Co. Judge Charles B. Kennamer, on Oct. 2, issued a temporary injunction in favor of the company, restraining collection of its taxes for 10 days from Oct. 2 and set Oct. 9 as the date for hearing on a permanent injunction. The restraining order was granted on the condition that the company furnish security for the taxes due Oct. 1, amounting to about \$31,000, or place that amount in a Montgomery depository, subject to the order of the court.

The Alabama tax was due Oct. 1, but through agreement, payment was suspended until Oct. 5 on account of pending court action. The Alabama act levies a 1 per cent salary tax on employees of firms employing more than eight persons and recaptures 90 per cent of the Federal tax levy.

Attorneys for the Gulf States Steel Co. had first planned to challenge the constitutionality of both the Alabama and Federal laws covering unemployment compensation. Efforts were made to secure an agreement from State authori-

ties whereby all taxes due would be deposited or impounded in some bank where the funds would be held pending the outcome of the litigation. Due to administrative difficulties the State could not enter into such an agreement. The Gulf States Steel Co. then proceeded with its application in the Federal court.

Had the agreement been reached, the present case would have been withdrawn and another suit instituted before a three-judge Federal court covering both the Alabama and the Federal acts.

The Federal act was not challenged at this time by the Gulf States Steel Co., since payments are not due until Jan. 1, but such action is contemplated.

Designs Telescoping Steel House

A SCHEME whereby a five-room house, completely prefabricated and assembled at the factory, and fully equipped and ready for occupancy, has been designed by G. B. Wallace, 411 East 53rd Street, New York. A unique feature is that the house may be telescoped



FABRICATED STEEL

... Lettings decline to 13,900 tons from 20,450 tons a week ago.

o o o

... New projects higher at 13,225 tons as against 9700 tons last week.

o o o

... Plate awards total 2625 tons.

NORTH ATLANTIC STATES

Auburn-Lewiston, Me., 1278 tons, State bridge, to Phoenix Bridge Co.

Providence, R. I., 225 tons, Orms Street bridge, to Boston Bridge Works, Inc., Cambridge, Mass.

Canton-Norwood-Westwood, Mass., 110 tons, State bridge, to Boston Bridge Works, Inc.

Malden, Mass., 400 tons, building for Continental Can Co., to Austin Co.

New Hartford, Conn., 195 tons, highway bridge, to American Bridge Co.

Montgomery County, N. Y., 110 tons, highway bridge, to R. S. McManus Steel Construction Co., Buffalo.

Delaware County, N. Y., 540 tons, highway bridge, to American Bridge Co.

New York, 550 tons, Queens construction shaft, midtown tunnel, to Jones & Laughlin Steel Corp.

New York, 315 tons, Winchester Avenue bridge, to Bethlehem Steel Co.

Rosewood, N. Y., 455 tons, Public School No. 162, to Dreier Structural Steel Co.

Forest Hills, N. Y., 115 tons, church, to Belmont Iron Works.

Smithtown, N. Y., 250 tons, bridge for Long Island Railroad, to American Bridge Co.

Mount Vernon, N. Y., 410 tons, Lockrell Holding Co. apartment buildings, to Schacht Steel Construction Co.

Buffalo, 240 tons, plant extension for Worthington Pump & Machinery Co., to Fort Pitt Bridge Works Co.

Newark, N. J., 215 tons, hospital, to Albert Smith's Sons.

Manayunk, Pa., 130 tons, warehouse, to Morris Wheeler & Co., Philadelphia.

Juniata County, Pa., 760 tons, highway work, to Bethlehem Steel Co.

Bedford County, Pa., 200 tons, highway work, to Bethlehem Steel Co.

Pittsburgh, 335 tons, addition to Duquesne Brewery Co., to Pittsburgh Bridge & Iron Works, Rochester, Pa.

Holidaysburg, Pa., 120 tons, high school, to Griffith-Custer Steel Co., Johnstown, Pa.

Washington, 330 tons, police court building, to Fort Pitt Bridge Works Co.

SOUTH AND SOUTHWEST

Mobile, Ala., 460 tons, fruit shed, to Ingalls Iron Works Co., Birmingham.

Port Birmingham, Ala., 315 tons, three trestles, to Virginia Bridge Co., Roanoke.

Stone County, Miss., 320 tons, bridge, to Nashville Bridge Co.

Globe, Ariz., 390 tons, two bridge projects, to Kansas City Structural Steel Co.

CENTRAL STATES

Dearborn, Mich., 445 tons, addition for American Blower Corp., to R. C. Mahon Co., Detroit.

Toledo, 850 tons, Libby Glass Co. building, to Bethlehem Steel Co.

Cincinnati, 500 tons, office and factory for Merrell Co., to L. Schreiber & Sons Co., Cincinnati.

Chicago, 325 tons, columns and slabs for Commonwealth Edison Co., to American Bridge Co.

Fremont, Neb., 1180 tons, two viaducts, to American Bridge Co.

Nebraska City, Neb., 395 tons, bridge, to Omaha Steel Works.

North Platte, Neb., 495 tons, bridge, to Omaha Steel Works.

WESTERN STATES

Bakersfield, Cal., 150 tons, airplane hangar, to Golden Gate Iron Works, San Francisco.

Glendale, Cal., 560 tons, bridge for United States Engineers, to Bethlehem Steel Co.

San Bernardino, Cal., 182 tons for Treasury Department, to Bethlehem Steel Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Staten Island, N. Y., 250 tons, bridges.

Brooklyn, 400 tons, St. Francis Assissi Church school building.

Brooklyn, 700 tons, apartment house for Silk & Hitlin.

Solvay, N. Y., 400 tons, steel boxes for Solvay Process Co.

Niagara Falls, N. Y., 250 tons, buildings for Carborundum Co.

Philadelphia, 300 tons, loading platform for Atlantic Refining Co.

Harmarville, Pa., 200 tons, building "D" for Gulf Research Development Corp.

Buffalo, 500 tons, research laboratory for Linde Air Products Co.

THE SOUTH

Fayetteville, N. C., 600 tons, bridge.

State of North Carolina, 875 tons, bridges.

Morgantown, N. C., 200 tons, highway bridge over Catawba River.

Monroe County, Fla., 1200 tons, material for bridges Nos. 2, 3, 4 and 5.

Key West, Fla., 240 tons, rebuilding piers, United States Naval Station.

Houston, Tex., 800 tons, bridge.

CENTRAL STATES

Detroit, 350 tons, manufacturing and office building, Herronzimmers Mould Co.

Cincinnati, 975 tons, Shillito department store extension.

Geneva, Ohio, 375 tons, bridge.

Akron, Ohio, 542 tons, three State bridges.

Crawford County, Ohio, 444 tons, three bridges.

Oakford, Ill., 800 tons, bridge.

Atchison, Kan., 2500 tons, bridge.

WESTERN STATES

Crook County, Wyo., 130 tons, bridge work; bids Oct. 8.

Cle Elum, Wash., 188 tons, Bristol Fill bridge; bids opened.

FABRICATED PLATES

AWARDS

Rockland, Mass., 300 tons, water tank, to Chicago Bridge & Iron Works.

Massena, N. Y., 440 tons, 100 pot shells for Aluminum Co. of America, to Blaw-Knox Co., Pittsburgh.

Milwaukee, 260 tons, steel pipe, to Western Gas Construction Co., Fort Wayne, Ind.

Los Angeles, 400 tons, water pipe, to Emsco Derrick & Equipment Co., Los Angeles.

Los Angeles, 1225 tons, water pipe, to Southwest Welding & Mfg. Co., Inc., Alhambra, Cal.

NEW PROJECTS

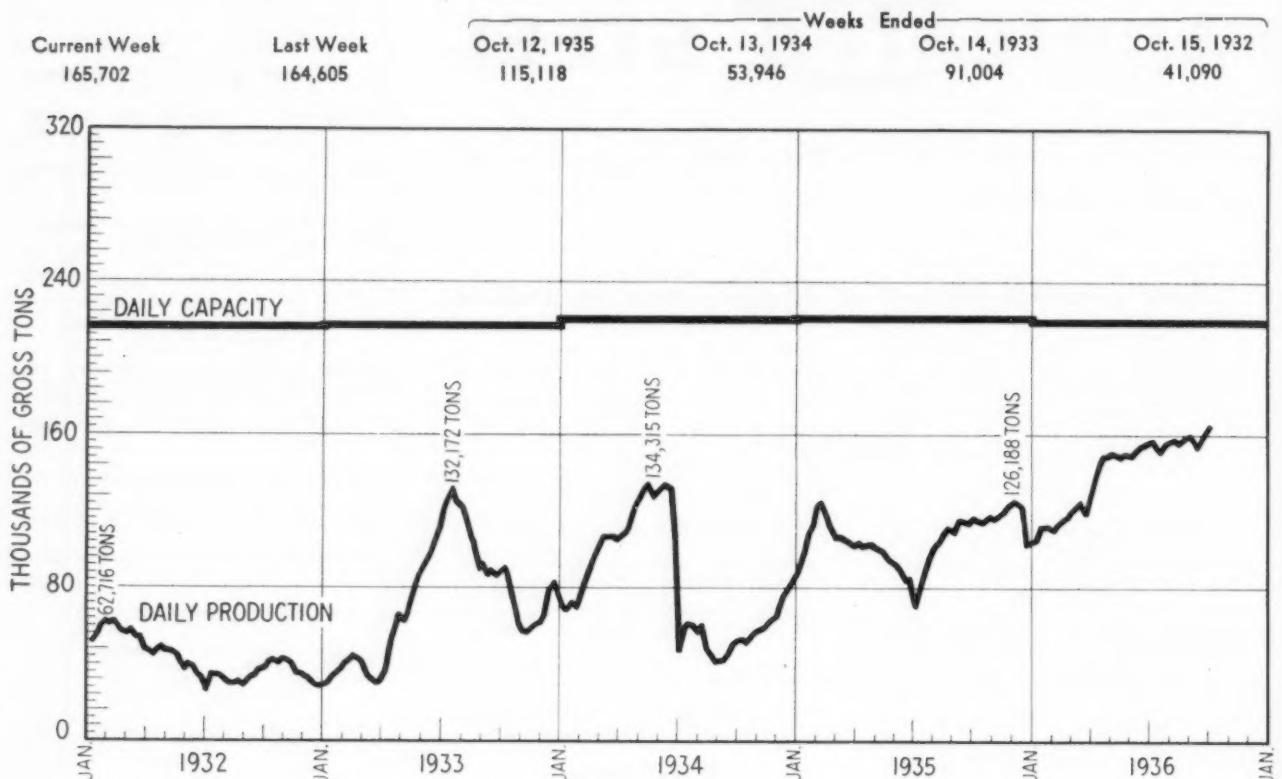
Los Angeles, 232 tons, upper feeder of Colorado River; bids Oct. 22.

Aberdeen, Wash., 2700 tons, pipe line to Hoquiam; bids opened.

Bethlehem Steel Co. will be host to members of the Philadelphia chapter of the American Foundrymen's Association on Friday, Oct. 9, at its plant at Bethlehem, Pa. After a tour of the plant, the visitors will be addressed by W. S. Bourlier, chief engineer of the Bethlehem mines department, on "Raw Materials for the Iron and Steel Industry."

STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1932-1936



Figures for the current week are not indicated on the chart until the following week.

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	Weeks Ended		
			Sept. 12, 1936	Oct. 12, 1935	Oct. 13, 1934
Pittsburgh	76.0	74.0	68.0	45.0	16.0
Chicago	76.0	74.0	73.0	59.0	26.0
Valleys	79.0	82.0	65.0	53.0	26.0
Philadelphia	55.0	55.0	55.0	40.0	21.0
Cleveland	80.0	80.0	72.0	59.0	24.0
Buffalo	80.0	79.0	80.0	46.0	24.0
Wheeling	97.0	96.0	94.0	80.0	33.0
Southern	60.5	60.5	60.5	54.0	25.0
Ohio River	94.0	92.0	89.0	84.0	25.0
Western	59.0	70.0	70.0	35.0	15.0
St. Louis	72.5	73.5	71.0	58.0	25.0
Detroit	95.0	95.0	100.0	90.0	76.0
Eastern	90.0	90.0	90.0	35.0	20.0
Aggregate	75.5	75.0	70.0	52.0	24.5
Average Year to Date	64.9	64.6	63.9	46.7	39.3

Weekly Booking of Construction Steel FROM THE IRON AGE

	Week Ended				Year to Date	
	Oct. 6, 1936	Sept. 29, 1936	Sept. 9, 1936	Oct. 8, 1935	1936	1935
Fabricated structural steel awards.....	13,900	20,450	21,135	20,100	844,830	605,285
Fabricated plate awards.....	2,625	1,790	680	500	172,800	113,385
Steel sheet piling awards.....	0	0	555	3,300	42,175	54,010
Reinforcing bar awards.....	4,555	4,610	2,870	6,750	278,930	255,825
Total Lettings of Construction Steel...	22,080	26,850	25,240	30,650	1,338,735	1,028,505



...SUMMARY OF THE WEEK...

... Backlogs of orders are largest since 1929.

o o o

... Railroad buying expected to give further impetus to market.

o o o

... Pig iron output in September gained 4.2 per cent over August.

STEEL companies enter the final quarter of the year with the largest unfilled orders since 1929, and in one respect the situation is more favorable than in that boom period because present commitments do not include the speculative purchases that then existed. Heavy ordering in the past week has brought another increase in steel ingot output to 75½ per cent, a new top for the year.

While ingot production in September declined slightly from August, the total for nine months of 33,605,304 gross tons indicates a 1936 output of fully 46,000,000 tons, which would be about 85 per cent of 1929. Pig iron output figures, gathered by THE IRON AGE, show a September total of 2,730,293 gross tons, or 91,010 tons a day, a gain of 4.2 per cent over the August daily rate. Seven additional furnaces went into blast, making a total of 155 on Oct. 1.

WHILE the lighter steel products are in greatest demand, the heavy products have made substantial gains. As evidence, the Pittsburgh district, where heavy steels predominate, is now operating at 76 per cent, having for the first time since 1930 passed the average for the country as a whole.

The sheet situation has reached a point where some users may not be able to obtain all they will want during the fourth quarter. A few mills are virtually out of the market on cold-rolled and light hot-rolled annealed sheets for the remainder of the year.

A contra-seasonal improvement in tin plate keeps the operation of tin mills at 90 per cent, further expansion being prevented by lack of raw steel. Tin plate deliveries are six weeks or longer, with some reservations being made for January, 1937. No change in the tin plate price for next year is expected. The tin can, having won markets in beer and wine, is preparing to invade the soft drink field.

As the automobile industry moves toward higher production of new models its requirements will increase. The farm implement industry has all but forgotten the drought and is proceeding toward increased output. Railroad buying of equipment and track supplies is on the upgrade. Of the major consumers of steel, only building construction shows a pronounced lag notwithstanding that Government aid has been expended mostly in that direction.

RAILROAD buying is likely to be one of the major factors in increasing business during the remainder of the year. Expected rail buying of several hundred thousand tons has been started off by the Louisville & Nashville, which placed 27,000 tons plus accessories with the Alabama mill. The Sante Fe inquiry for 90,000 tons may be acted upon shortly, and other roads that are to buy heavily are the Chicago & North Western and the Western Pacific.

Railroads have received intimations that an advance to \$40 for rails will go into effect Jan. 1.

In equipment the outstanding inquiry is that of the New York Central for 50 locomotives—25 large passenger type and 25 switching engines. The Chicago & Eastern Illinois has ordered 500 freight cars and the Wabash will build 400 in its own shops. The Cambria & Indiana has issued an inquiry for 300 hopper cars. Meanwhile, many railroads are using all pressure for material to repair bad order cars. With carloadings over 800,000, a shortage of coal cars has already developed, and shortages of other types are expected.

A gas-carrying line from Northwestern Pennsylvania to Rochester, N. Y., 92 miles, requiring 9000 tons of 14-in. pipe, has been awarded to the A. O. Smith Corp., Milwaukee.

SCRAP markets are in a waiting position, with prices tending toward weakness in some districts. Pig iron producers have booked fairly large tonnages for fourth quarter. The continued scarcity of coke may force an advance in pig iron prices before the end of the quarter.

One or two wire mills have announced quantity extras on wire and merchant products for fourth quarter. On wire the base quantity is 40,000 to 1000 lb., deductions applying for larger quantities, up to \$3 a ton for more than 100 tons, and extras for small lots up to \$3 per 100 lb. for lots under 100 lb. On merchant products extras apply on quantities less than 40,000 lb.



...PITTSBURGH...

... Ingot rate moves up to 76 Per Cent because of heavy influx of orders.

... First time since 1930 the district has been in this favorable position.

... Tin plate specifications are being received for January, 1937.

PITTSBURGH, Oct. 6.—Exceptionally heavy bookings of bars, wire products and sheets up to and including Sept. 30 are responsible for a two-point rise in ingot output in the Pittsburgh district to 76 per cent of capacity, which is one point above last week's rate for the country as a whole, the first time the Pittsburgh district has been in this favorable position since 1930. Expanding output has moved the Wheeling district up one point to 97 per cent.

Backlogs of hot-rolled bars average six weeks, while present orders for cold-finished material would support present finishing activity for at least six to seven weeks. Backlogs of sheets average about six weeks with some grades running to eight weeks. There is no indication of there having been any speculative buying since all material booked is for actual known requirements. While automobile tonnages have been large, producers feel that if present estimated motor car schedules are realized, car manufacturers will not only be pressing for quick deliveries, but will be in the market for more steel within the next 30 days. Meanwhile, demand for heavy shapes and plates has shown no tendency to fall off. Quite a few privately financed projects are making their appearance.

Both demand and production of semi-finished steel continues unabated with many of the integrated mills needing all they can produce for their own consumption. Reflecting the tight situation in this market both in regard to supply and price, one non-integrated mill in this district has under consideration the installation of open hearths and soaking pits.

Third quarter quotations on reinforcing bars have been reaffirmed for fourth quarter delivery at 2.05c. a lb. f.o.b. Pittsburgh.

Strip steel specifications are being received in good volume.

Tin plate operations remain at 90 per cent and in some cases packers specifications for 1937 have been received.

Raw material markets are showing no deviation from their recent strength.

Pig Iron

Pig iron production in this district showed an increase during September over August and new orders continue in good volume. Jones & Laughlin Steel Corp. has blown in its last idle stack, while the Struthers furnace at Struthers, Ohio, is expected to be blown in around Oct. 15. Having been idle the past few months for relining, the Donora furnace of the American Steel & Wire Co. was blown in last week. At least one other steel stack is being prepared for resumption of operations some time in November. Part of the increased demand for pig iron is a result of a higher percentage of iron being melted in open-hearth furnaces due to high scrap prices, while on the other hand steel foundries have been showing improvement in operations.

Semi-Finished Steel

Specifications received during September were the largest in several years. Some non-integrated mills have been unable to obtain as much material as they want. Reflecting the tight situation in the supply of semi-finished steel and the narrowing of the range between the price of raw steel and

finished material, one non-integrated mill in this district is planning the installation of steel making equipment. Under consideration are three open-hearth furnaces of approximately 50-ton capacity each, soaking pits and the installation of a two-stand mill which will take slab ingots and turn them into sheets. Tentative plans call for the first stand to do the roughing operation while the second stand will complete the sheet job. Whether this project will go through is not certain at this time, although a decision is expected within the next month.

Bolts, Nuts and Rivets

Specifications continue in good volume, although aggregate tonnages are not as great as expected by producers. Possibly this can be traced to a slight stocking up by customers previous to the last increase in prices. With customers' stocks moving rather briskly and the possibility of heavier car repair programs, a better volume of orders is expected before the month is out.

Bars

Aggregate bookings during September were larger than for any month in the past several years. From about the third week in August, bar specifications have shown a steady increase. After fourth quarter prices were announced, a sharp spurt in bookings occurred which continued up to the end of September. While much of this tonnage placed was in anticipation of the price increase, nevertheless delayed deliveries play a large part in the disposition of customers to order ahead. Coincident with the increase in new orders has been a steady improvement in consumption. There is little doubt that mills will have extreme pressure put on them during the rest of this month for deliveries, even though orders were accepted for shipment at the mill's convenience. Such a situation occurred last July.

Cold-Finished Bars

Business placed during September was better than in any month since 1929. The orders were evenly divided between automotive interests and miscellaneous sources. Considerable tonnage has been booked by warehouses and electrical appliance manufacturers. Backlogs have increased to such a point that mills could be fully occupied for four to six weeks without the support of new business. There is good reason to believe that before the month is out considerable pressure will be exerted for deliveries. While automobile interests placed heavy orders before the price increases went into effect, should

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous;
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Oct. 6, 1936	Sept. 29, 1936	Sept. 9, 1936	Oct. 8, 1935
Rails, heavy, at mill.....	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2
Light rails, Pittsburgh.....	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh..	32.00	32.00	30.00	27.00
Sheet bars, Pittsburgh.....	32.00	32.00	30.00	28.00
Slabs, Pittsburgh.....	32.00	32.00	30.00	27.00
Forging billets, Pittsburgh...	39.00	39.00	37.00	35.00
Wire rods, Nos. 4 and 5, P'gh	40.00	40.00	38.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.80	1.80	1.80	1.70

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	2.05	2.05	1.95	1.85
Bars, Chicago.....	2.10	2.10	2.00	1.90
Bars, Cleveland.....	2.10	2.10	2.00	1.90
Bars, New York.....	2.40	2.40	2.30	2.20
Plates, Pittsburgh.....	1.90	1.90	1.90	1.80
Plates, Chicago.....	1.95	1.95	1.95	1.85
Plates, New York.....	2.19	2.19	2.19	2.09
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.80
Structural shapes, Chicago..	1.95	1.95	1.95	1.85
Structural shapes, New York.	2.16 1/4	2.16 1/4	2.16 1/4	2.06 1/4
Cold-finished bars, Pittsburgh	2.35	2.35	2.25	1.95
Hot-rolled strips, Pittsburgh.	1.95	1.95	1.95	1.85
Cold-rolled strips, Pittsburgh.	2.60	2.60	2.60	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.60	2.60	2.50	2.40
Hot-rolled annealed sheets, No. 24, Gary.....	2.70	2.70	2.60	2.50
Sheets, galv., No. 24, P'gh...	3.20	3.20	3.20	3.10
Sheets, galv., No. 24, Gary...	3.30	3.30	3.30	3.20
Hot-rolled sheets, No. 10, Pittsburgh.....	1.95	1.95	1.95	1.85
Hot-rolled sheets, No. 10, Gary.....	2.05	2.05	2.05	1.95
Cold-rolled sheets, No. 20, Pittsburgh.....	3.05	3.05	3.05	2.95
Cold-rolled sheets, No. 20, Gary.....	3.15	3.15	3.15	3.05
Wire nails, Pittsburgh.....	2.05	2.05	1.90	2.40
Wire nails, Chicago dist. mill	2.10	2.10	1.95	2.45
Plain wire, Pittsburgh.....	2.50	2.50	2.40	2.30
Plain wire, Chicago dist. mill.	2.55	2.55	2.45	2.35
Barbed wire, galv., P'gh....	2.55	2.55	2.40	2.80
Barbed wire, galv., Chicago dist. mill.....	2.60	2.60	2.45	2.85
Tin plate, 100-lb. box, P'gh..	\$5.25	\$5.25	\$5.25	\$5.25

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron

Per Gross Ton:	Oct. 6, 1936	Sept. 29, 1936	Sept. 9, 1936	Oct. 8, 1935
No. 2 fdy., Philadelphia.....	\$21.3132	\$21.3132	\$21.3132	\$20.3132
No. 2, Valley furnace.....	19.50	19.50	19.50	18.50
No. 2, Southern Cin'ti.....	20.2007	20.2007	20.2007	19.2007
No. 2, Birmingham.....	15.88	15.88	15.88	14.50
No. 2, foundry, Chicago*....	19.50	19.50	19.50	18.50
Basic, del'd eastern Pa.....	20.8132	20.8132	20.8132	19.8132
Basic, Valley furnace.....	19.00	19.00	19.00	18.00
Malleable, Chicago*.....	19.50	19.50	19.50	18.50
Malleable, Valley.....	19.50	19.50	19.50	18.50
L. S. charcoal, Chicago.....	25.7528	25.7528	25.2528	24.7528
Ferromanganese, seab'd car- lots.....	75.00	75.00	75.00	85.00

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh...	\$18.25	\$18.25	\$17.50	\$13.50
Heavy melting steel, Phila...	15.75	15.75	15.00	12.00
Heavy melting steel, Ch'go...	16.25	16.25	16.25	12.50
Carwheels, Chicago.....	16.50	16.50	16.00	12.75
Carwheels, Philadelphia.....	16.75	16.75	16.25	12.75
No. 1 cast, Pittsburgh.....	16.25	16.25	15.75	14.25
No. 1 cast, Philadelphia.....	16.75	16.75	16.75	11.75
No. 1 cast, Ch'go (net ton)...	14.00	14.00	13.50	11.25
No. 1 RR. wrot., Phila.....	15.75	15.75	14.75	12.25
No. 1 RR. wrot., Ch'go (net)	14.25	14.25	14.25	9.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt.....	\$3.75	\$3.75	\$3.65	\$3.60
Foundry coke, prompt.....	4.25	4.25	4.00	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn....	9.75	9.75	9.75	9.00
Lake copper, New York.....	9.87 1/2	9.87 1/2	9.87 1/2	9.37 1/2
Tin (Straits), New York....	45.37 1/2	45.40	45.20	51.00
Zinc, East St. Louis.....	4.85	4.85	4.85	4.85
Zinc, New York.....	5.22 1/2	5.22 1/2	5.22 1/2	5.22 1/2
Lead, St. Louis.....	4.45	4.45	4.45	4.45
Lead, New York.....	4.60	4.60	4.60	4.60
Antimony (Asiatic), N. Y....	12.50	12.50	12.50	14.40

The Iron Age Composite Prices

Finished Steel

Oct. 6, 1936	2.197c. a Lb.
One week ago	2.197c.
One month ago	2.159c.
One year ago	2.130c.

Based on steel bars, beams, tank plates, wire rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

	High	Low
1936.....	2.197c., Sept. 29;	2.084c., Mar. 10
1935.....	2.130c., Oct. 1;	2.124c., Jan. 8
1934.....	2.199c., April 24;	2.008c., Jan. 2
1933.....	2.015c., Oct. 3;	1.867c., April 18
1932.....	1.977c., Oct. 4;	1.926c., Feb. 2
1931.....	2.037c., Jan. 13;	1.945c., Dec. 29
1930.....	2.273c., Jan. 7;	2.018c., Dec. 9
1929.....	2.317c., April 2;	2.273c., Oct. 29
1928.....	2.286c., Dec. 11;	2.217c., July 17
1927.....	2.402c., Jan. 4;	2.212c., Nov. 1

Pig Iron

\$18.73 a Gross Ton
18.73
18.73
17.84

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	High	Low
1936, Jan. 7;	\$18.73,	Aug. 11
18.84, Nov. 5;	17.83,	May 14
17.90, May 1;	16.90,	Jan. 27
16.90, Dec. 5;	13.56,	Jan. 3
14.81, Jan. 5;	13.56,	Dec. 6
15.90, Jan. 6;	14.79,	Dec. 15
18.21, Jan. 7;	15.90,	Dec. 16
18.71, May 14;	18.21,	Dec. 17
18.59, Nov. 27;	17.04,	July 24
19.71, Jan. 4;	17.54,	Nov. 1

Steel Scrap

\$16.75 a Gross Ton
16.75
16.25
12.67

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low
1936, Sept. 23;	\$12.67,	June 9
13.42, Dec. 10;	10.33,	April 22
13.00, Mar. 13;	9.50,	Sept. 25
12.25, Aug. 8;	6.75,	Jan. 3
8.50, Jan. 12;	6.43,	July 5
11.33, Jan. 6;	8.50,	Dec. 29
15.00, Feb. 18;	11.25,	Dec. 9
17.58, Jan. 29;	14.08,	Dec. 3
16.50, Dec. 31;	13.08,	July 2
15.25, Jan. 11;	13.08,	Nov. 22

their production schedules be up to expectations, they will be in the market for more steel before present backlogs have been exhausted. To a similar degree is this the case with miscellaneous customers.

Reinforcing Steel

Third quarter quotations have been reaffirmed for fourth quarter delivery at 2.05c. a lb. f.o.b. Pittsburgh, for billet steel reinforcing bars. On stock lengths, jobbers will receive 30c. per 100 lb. allowance and will pay an extra of 10c. per 100 lb. on cut lengths. Within the past few weeks, specifications from jobbers have shown a little improvement.

Shapes and Plates

Inquiries during the past week are satisfactory in that there continues to be an increasing number of privately financed projects. Most of these involve the construction of new plants and the extension of old plants, and recently there have been signs of a resumption of apartment house building. American Bridge Co., Pittsburgh, has received two awards for bridges, one a state bridge involving 535 tons, at Hancock, N. Y., and a railroad bridge for the New York, New Haven & Hartford Railroad at Hartford, Conn., taking 760 tons. Contract for the Queens construction shaft, midtown tunnel, New York City, calling for 525 tons, went to Jones & Laughlin Steel Corp.

Steel Sheet Piling

The bids scheduled for Oct. 2 on the bulkhead at Seawalls Point, Va., for the U. S. Navy Bureau of Supplies & Accounts, have been postponed to Oct. 9. George Hockensmith, Albany, N. Y., was the low bidder on 892 tons of steel sheet piling to be used in the construction of a sewage disposal plant at Buffalo. Several large projects now pending will be awarded in the near future.

Strip

Without the stimulus of higher prices in the fourth quarter, bookings on hot and cold strip steel continue in good volume. Automobile parts manufacturers and electrical appliance interests account for a large part of the business being placed.

Tin Plate

Specifications from general line can manufacturers have eased off slightly within the past 10 days. While packers can specifications for 1936 crops are practically completed, some orders for 1937 requirements have appeared. With the possibility of this type of orders increasing during the next month or two, tin plate operations are not expected to experience any sharp falling off for some time.

Tin plate producers are receiving a satisfactory volume of releases on material held in stock. Operations remain at approximately 90 per cent.

Tubular Products

Specifications for oil country goods are flowing in freely and there is no change in the good volume of orders being received for standard pipe. A. O. Smith Corp., Milwaukee, has received an order for approximately 9000 tons of 14-in. line pipe from the Godfrey Cabot Gas Corp., Boston, for a 92-mile line running to Rochester, N. Y., from the gas fields in northwestern Pennsylvania.

Wire Products

Bookings of wire rods, manufacturers' wire and merchant wire products were extremely heavy during September. In most cases the heavy influx of orders was the result of anticipating fourth quarter price increases. All material ordered to the end of last month is to be shipped by Oct. 15. Buying at the new prices will undoubtedly be light over the next month. Resumption of fresh purchases, however, might materialize sooner than expected since many jobbers' stocks were abnormally low before the recent bulge in specifications. Consumption of merchant wire items has shown a steady increase over the past month.

Sheets

Total tonnages placed on the books during September were greater than in any month in several years. Demand was fairly well divided between automotive interests and miscellaneous sources, the bulk of the specifications during the latter part of last month calling for those items which were increased for fourth quarter delivery. As a result of this heavy placement, average backlogs are about six weeks, with certain grades running to eight weeks. Those products which did not experience an increase in price have been moving steadily over the past few weeks.

Warehouse Business

Effective Oct. 1 for delivery within the Pittsburgh district, local warehouses have increased the price of soft steel bars and small shapes 10c. per 100 lb. to 3.15c. a lb. and cold drawn bars 10c. per 100 lb. to 3.60c. a lb. No. 24-gage hot-rolled annealed sheets have been marked up 10c. per 100 lb. to 3.45c. a lb. This revision upward in price corresponds with the recent change in quotations by the mills.

Coal and Coke

Cooler weather, which increased domestic buying, and a disposition

on the part of manufacturing interests to begin stocking coal, have brought about a sharp increase in coal production in this area. Movement to domestic coal dealers is more brisk than a few weeks ago. The coke situation has shown no change in the past week. During normal times, domestic size coke in Detroit and vicinity has been supplied to some extent by the Ford plants. During the depression some of these plants were closed down and as a result local dealers for the past few months have been receiving numerous inquiries from that district for beehive domestic sizes. It is understood that the Ford plants have been repaired and will be in operation shortly, which might alleviate to some extent the shortage in the Detroit district for domestic size coke. The usual spread between domestic size beehive and furnace grades is 75c., which takes care of the increased cost of crushing. Present quotations on these grades show an average of a 50c. spread, which in some cases is the reason why plants which heretofore served domestic requirements are now catering to furnace coke consumers. There is a distinct possibility, however, that a heavy demand for domestic sizes will increase the spread to the normal amount by the time cold weather sets in. Meanwhile, work is going forward on the Youngstown Coke Works ovens at Stambaugh, Pa., which have been leased by the Bortz interests from the H. C. Frick Coal & Coke Co. Operators expect to have part of these ovens in within the next two months.

The office of the Division Engineer, North Pacific Division, Corps of Engineers, has just issued a report entitled, "The Feasibility of establishing an Iron and Steel Industry in the Lower Columbia River Area Using Electric Pig Iron Furnaces." The report, prepared by Raymond M. Miller, metallurgical engineer, is based on an investigation of the iron and steel industry on the Pacific Coast, and of the possibility of using electric furnaces as the basis of a plant in the Columbia River area. It contains a discussion of the electric furnace production of pig iron and the practice in other countries, as well as a detailed consideration of the conditions at Portland which would contribute to the success or failure of such an industry, together with estimated costs and market studies. The report is published in two mimeographed volumes, which can be obtained at the office of the Division Engineer, North Pacific Division, 523 Pittock Block, Portland, Ore., at \$2.00 per volume.



CHICAGO

... Ingot output rises to 76% of district's capacity.

o o o

... Railroad equipment buying will add to strength of steel market.

o o o

... Farm implement manufacturers busy; automobile needs are increasing.

CHICAGO, Oct. 6.—Demand for finished steel, semi-finished steel and pig iron presses forward, and every phase of this market is tightening with no signs apparent of a change in the rate of acceleration before the second half of the month. The upward surge of ingot production is carrying output above the 76 per cent of capacity mark, or a net minimum gain of two points within the week.

Although automobile plants are handicapped by tool and die troubles and are behind their schedules, nevertheless their steel wants are on the upgrade. Farm implement manufacturers have all but forgotten the drought and their production programs are on the march to higher levels.

An order for 500 freight cars, an inquiry for 300 hopper cars and construction of 400 cars by the Wabash, all added to busy railroad repair shops and the prospect for additional car buying, once again bring the railroad equipment market into sharp relief notwithstanding that the general run of steel business is active.

Coal shippers are already complaining of a car shortage and pig iron and steel producers figure it is only a question of a short time before this condition backs up to them.

The labor situation, though generally not disturbing, is dotted with complaints of shortage of skilled help and a quite general lack of interest by many men who are on regular payrolls.

The scrap market has leveled off, but consumption remains high and brokers feel that the present lull will be of short duration, probably not over three weeks.

Pig Iron

New buying continues at a very satisfactory pace and, with the melt climbing, there is promise of secondary requirements before many weeks have passed. The character of books and the disposition of users point to fourth quarter shipments as eventually reaching a new high for the year. Shortage of skilled help is reported from most shops, some of which are having minor labor troubles. The advance in charcoal prices, while not wholly unanticipated by users, was sprung as a surprise, but it has not checked the market.

Reinforcing Bars

Miscellaneous business continues to flow in, and shops operating on three shifts foresee no letdown. In fact, business in sight leads some to the conclusion that top operations will continue throughout most of the remaining part of the year. Evidently political reasons are spurring housing projects which range from 800 to 1000 tons each at Detroit, Toledo, Cincinnati, Minneapolis and Chicago. An apartment building has been let at Davenport, Iowa, and similar projects are pending in Chicago. This type of building construction is heartening because it was the first to drop away in 1929 and it has been the last to open up.

Warehouse Business

Advanced quotations on wire products by mills have not as yet been followed by warehouses. September business climbed above August. October is on its way to be the peak month of the year, which would be true to form. Heavy steel sections, the last classification

to get under way in volume, are now in excellent demand and users as far away as Philadelphia are scouring Chicago warehouses for needed sizes. Mill deliveries are troublesome to warehousemen, who nevertheless are maintaining well-balanced stocks.

Rails

This market remains quiet on the surface, but underneath some real tonnages are taking shape. The Santa Fe is still to be heard from and the Chicago & North Western is counted on to buy heavily. The Western Pacific contemplates spending \$4,000,000, most of which will be for track work. There is some indication that a few fair-sized tonnages will soon be ordered for emergency purposes, the carryover of rails in railroad hands being almost negligible. Orders for track accessories continue to roll in, the week's purchases consisting of 5000 tons of tie plates, 500 tons of splice bars and a sprinkling of spikes and bolts.

Sheets

Fourth quarter books continue to fill and the delivery situation becomes more serious each day. Automobile plants are drawing heavily against flat rolled mills and their needs are expected to keep growing until the second half of the month. Jobbers are moving large quantities of sheets and downspout, furnace and air-conditioning equipment. Makers are all heavily engaged. Use of tin plate is also expanding as new uses are found daily. Can manufacturers are now looking to the use of cans for all soft drinks.

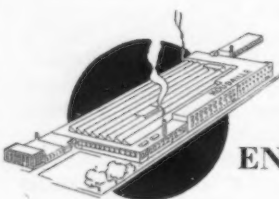
Bars

Both sales and specifications are moving up sharply and deliveries are now no better than four to five weeks. Automobile builders are rapidly expanding requirements and forgers and parts manufacturers are pressing mills for deliveries. There is excellent distribution through jobbers, which gives good insight into activity on the part of small and miscellaneous shops. Farm implement plants continue to push up production schedules and the drought is all but forgotten.

Structural Material

Practically all current awards fall in the classification of 100 tons or less each. Yet, the aggregate of this kind of business is impressive, having reached the total of about 3000 tons. The rush to build bridges is still on and new projects of this kind range in size from 500 to 2500 tons each. Bids will be

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taken in November on another dam across the Mississippi River and several other projects of similar character may develop before the end of the year. Deliveries on shapes are now not better than four weeks.

Plates

A. O. Smith Corp. has taken a pipe order which calls for 9000

tons, shipment of the finished product to be made to the East. A small pipe line project is developing in the West. The railroad equipment market is enlivened by an order for 500 cars placed by the Chicago & Eastern Illinois, the announcement that the Wabash will build 400 hopper cars in its own shop, and the fact that railroad shops are busy and are constantly

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pressing mills for deliveries of needed steel supplies.

Wire Products

Output has risen to 70 per cent of capacity as mills strain to complete by Oct. 15 orders taken at third quarter prices. As matters now stand, this task cannot be accomplished before the end of the month. Fourth quarter buying is slowly getting under way. September was the second largest month of the year, July having been the peak. October bids fair to take first place with a peak coming soon after the middle of the month. Jobbers are falling far short of what had been expected of them in the matter of fall demand.

Quantity Extras on Wire Products

ONE or two wire mills have announced quantity differentials on wire products for fourth quarter. Subject to adoption by other mills, those for merchant wire products are as follows:

40,000 to 10,000 lb., inclusive, 20c. per 100 lb. extra.

10,000 to 5000 lb., inclusive, 30c. per 100 lb. extra.

Under 5000 lb., 40c. per 100 lb. extra.

Manufacturers' wire carries the following deductions:

100 tons and over, 15c. per 100 lb.

100 to 60 tons, 12½c. per 100 lb.

60 to 40 tons, 10c. per 100 lb.

40 to 20 tons, 5c. per 100 lb.

40,000 lb. to 1000 lb., base.

Under 1000 lb., extras are as follows:

To and including 500 lb., 25c. per 100 lb.

500 to 300 lb., inclusive, 50c. per 100 lb.

300 to 200 lb., 75c. per 100 lb.

200 to 100 lb., \$1.00 per 100 lb.

Under 100 lb., \$3.00 per 100 lb.

In addition to these extras on manufacturers' wire, all quantities less than carloads carry an additional extra of 10c. per 100 lb.

Detroit Steel Co. Buys Strip Mill

DETROIT STEEL CO., Detroit, has purchased from the United Engineering & Foundry Co. a cold-rolled strip mill which will be a duplicate of the one installed in early 1935, and which was also built by United Engineering. The latest installation will increase annual production of the company by approximately 40,000 tons of cold-rolled strip up to 20 in. wide.



... CLEVELAND ...

... Sheet production may not be sufficient to supply demand.

o o o

... Mills enter fourth quarter with heavy backlogs of sheets and bars.

o o o

... Heavy ore movement may reach 45,000,000 tons for season.

CLEVELAND, Oct. 6.—Ingot output in the Cleveland-Lorain district is unchanged this week at 80 per cent of capacity. In the Valley District, operations have declined three points to 79 per cent of capacity.

Demand continues good for about all finished steel, products that were not advanced in price Oct. 1. The effect of the higher prices in curtailing business after Sept. 30 was more noticeable in steel bars than in other products. Bar orders came out in very heavy volume until books were closed at the old price and consumers' requirements evidently are well taken care of for a number of weeks. Bar orders since the price advance have been negligible. Sheet orders are coming out in heavy volume except in hot-rolled annealed material, which was advanced. The heaviest demand is for cold-rolled sheets. The motor car industry continues to place sizable lots of this grade and considerable business is coming from refrigerator manufacturers and makers of other household equipment.

Fear that the production of sheets will be inadequate to supply the demand during the remainder of the year is being expressed by many consumers who are anticipating their requirements by placing orders for definite rolling dates, in some cases as far ahead as December. There is pressure for delivery from some sheet consumers who failed to place orders early enough to get material as soon as needed.

Mills have good backlogs of orders for wire rods and wire products and some makers will be badly crowded in completing these

orders by Oct. 15, the deadline date set by some mills for making shipments at the old prices.

With increased shipments of ore, there is some expectation of a revival of the Lake shipbuilding industry which has not built a bulk freighter for six years. Manufacturers of power shovels are very busy, the orders being stimulated by the increase in private building work. The Chesapeake & Ohio Railroad has sent inquiries to car builders for car repair work that will require 1200 tons of bars, plates and shapes and 250 tons of sheets.

Pig Iron

New demand has taken quite a spurt from automobile foundries that are stepping up production and buying by other consumers is holding up quite well. Specifications from makers of heating equipment have also increased. Merchant furnaces have accumulated good backlogs but not as heavy as at the time of the price advance a year ago. A leading Lake furnace interest shipped 22 per cent more iron in September than in August and its October shipments are expected to show considerable further gain.

Sheets

With mill schedules filled up for several weeks and the possibility of further extensions in deliveries, automobile manufacturers and miscellaneous consumers are placing orders in anticipation of their requirements for the next two months. Incoming business, because of this buying for future requirements, is in excess of ship-

ments. Orders are coming from motor car manufacturers in steady volume rather than spurts as formerly. Buyers in a few cases have placed orders for December shipping dates. Deliveries now extend to from four to six weeks and even longer with some mills. They are slower in light gages in black and particularly in cold rolled than in the heavier gages. Small lots of hot-rolled annealed sheets have been booked at the new price. Refrigerator manufacturers are buying in considerable quantities for new models. One of the large refrigerator makers has scheduled a 20 per cent increase in production in 1937 over this year. Stove manufacturers also look for an increased volume of business next year.

Strip Steel

Business is coming in good volume from motor car manufacturers and additional new orders were placed by parts makers during the week. Mills are being crowded for deliveries, which range from four to six weeks on cold-rolled strip. New orders have come from shovel manufacturers and there is considerable demand from makers of air-conditioning equipment.

Bars, Plates and Shapes

Mills have heavy backlogs of bar orders taken at the third quarter prices for rolling at their convenience and it will take them most of this month to get this tonnage out. A few small lots have been sold at the advanced price. Reinforcing bars are moving fairly well in small lots. Alloy bars are in brisk demand, reflecting the pick-up in automotive tonnage. The Libbey-Glass has awarded 850 tons of fabricated structural steel for a plant in Toledo. A Cleveland fabricator has taken 400 tons for a building for the Continental Can Co. New inquiry is light, although highway work in Ohio, expected to be out shortly, will require 1000 tons. Plates are in good demand.

Iron Ore

Water shipments of Lake Superior ore during September amounted to 7,481,071 tons, an increase of 2,663,457 tons or 55.29 per cent over the same period last year. September shipments increased 36,527 tons over August. Shipments this year until Oct. 1 gained 52.05 per cent over the corresponding period last year, being 33,762,588 tons, or an increase of 11,558,375 tons. The movement up to Oct. 1 indicates that shipments for the season will not fall much less than 45,000,000 tons, as recently predicted.



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...BUFFALO...

*... Steel ingot output
slightly higher.*



*... Several structural and
reinforcing jobs pending.*

BUFFALO, Oct. 6.—Operations of Buffalo steel mills are slightly higher, with Bethlehem's Lackawanna plant maintaining 22 to 23 active open hearths; Republic Steel Corp. 7 and Wickwire-Spencer Corp. 2. Seneca sheet division of Bethlehem is operating 100 per cent.

Announcement of the successful bidders for 2500 tons of structural steel and 1300 tons of reinforcing in the Tift Street viaduct job is expected to be made this week.

Fabricators are figuring the amount of structural and reinforcing that will go into the new research laboratory of the Linde Air Products Co., to be built in Tonawanda. Information is that the structural will amount to between 500 and 600 tons and the reinforcing tonnage considerably less. An addition to the Worthington Pump & Machinery Corp. plant here will require 200 tons of structural.



...BOSTON...

*... Pig iron buying slows
down.*



*... Foundries are taking
iron freely.*

BOSTON, Oct. 6.—Pig iron buying is not as active as it was in the closing days of September, but nevertheless is more so than it was a month ago. Sales the past week aggregated around 2000 tons. Many fourth quarter contracts provided for prompt shipment, and melters are calling for iron rather briskly, an indication that additional fourth quarter buying will develop later. Foundries are taking by-product foundry coke more freely in anticipation of a pinch in supplies during the winter.

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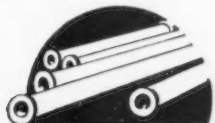
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dustrial outlook continues encouraging. Small tool manufacturers have been and are doing especially well. There are instances where their sales since Jan. 1, last, have been about 90 per cent of normal, using 1925, 1926 and 1927 as base of 100. More business is hanging over the fabricated structural steel market than at any previous time this year, and prospects for reinforcing steel bar business are much brighter than a month ago.



..CAST IRON PIPE..

Cumberland, Md., plans about 8½ miles of 36-in. for water trunk line, to cost about \$600,000; also new crosstown main with distributing lines. Extensions will be made in filtration plant to increase capacity about 50 per cent. Entire project will cost close to \$1,000,000, part to be secured through Federal grant. Whitman, Reardon & Smith, West Biddle and Charles Streets, Baltimore, are consulting engineers.

Bentleyville, Pa., plans pipe lines for water system and other waterworks installation. Cost about \$135,000. Bond issue in such amount will be voted at general election, Nov. 3. Chester Engineering Co., Clark Building, Pittsburgh, is consulting engineer.

Olcott, N. Y., will ask bids before close of year for pipe for water supply and other waterworks installation. Cost about \$115,000. Federal grant of \$51,600 has been secured, remainder of fund to be arranged through municipal financing.

Tuskegee, Ala., plans pipe lines for water system and other waterworks installation. Fund of \$50,000 is being secured through Federal aid.

West Blocton, Ala., plans about three and one-half miles of 4-in. for water system; also pumping unit with capacity of 125 gal. per min. and accessory equipment. John M. Gilfillan, Lyric Building, Birmingham, is consulting engineer.

Morrowville, Kan., plans pipe lines for water system; also tank and other waterworks installation. Cost about \$40,000. Financing is being arranged through Federal aid. Paulette & Wilson, National Reserve Building, Topeka, Kan., are consulting engineers.

Eldorado, Kan., plans early call for bids for pipe for water system and other waterworks installation, including 30,000-gal. steel tank and tower. Entire project will cost about \$80,000. Paulette & Wilson, National Reserve Building, Topeka, Kan., are consulting engineers.

Greeley, Colo., plans pipe lines for water system, including main line to replace present wood pipe. Cost about \$50,000.

Willow Lake, S. D., plans about four miles of various sized pipe for water system; also new pumping plant, 50,000-gal. steel tank on 100-ft. tower and other waterworks installation. Bond issue is being arranged. Dakota Engineering Co., Western Building, Mitchell, S. D., is consulting engineer.

Safford, Graham County, Ariz., is having surveys made by Welland Engineering Co., Pueblo, Colo., consulting engineer, for municipal water system, to include pipe lines, pumping station and other waterworks installation. Fund of \$496,365 has been secured through Federal aid, including grant of \$178,364.

Stevensville, Mont., closes bids Oct. 10 for 30,000 ft. of 4 to 12-in. for water system, including valves, fittings, etc. R. J. Hale, Missoula, Mont., is consulting engineer.

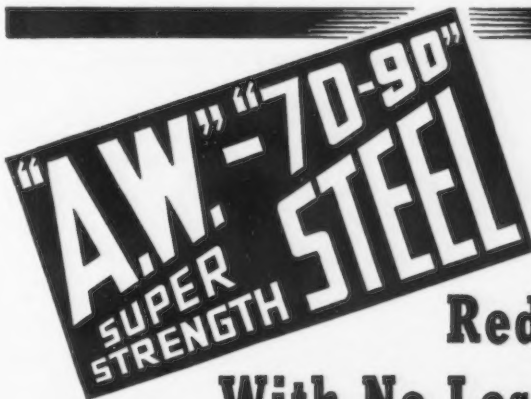
Railroads Propose Higher Freight Rates

WASHINGTON, Oct. 6.—Increases in iron and steel commodity rates of 10 per cent with a maximum of 1c. per 100-lb., or 20c. per net or gross ton, as rated, have been proposed by the railroads, to become effective Jan. 1 upon expiration of existing surcharges. It is proposed to increase column rates on iron and steel products 1c. per 100-lb.

In connection with rates for

shorter hauls disposition of fractions would be made on the basis of dropping fractions 0.24 and less, making fractions of 0.25 to 0.74 one-half cent and 0.75 and over the whole cent.

Higher rates are also proposed on raw materials entering into the manufacture of pig iron and steel. Railroad officials told THE IRON AGE that the proposed increased rates on iron and steel and their raw products would bring rates to levels below those now applicable and which include the surcharges which are to be replaced.



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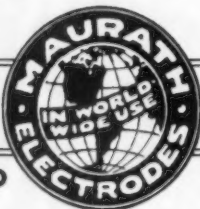
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While you are in Cleveland attending the National Metal Congress be sure to take in the American Welding Society Stag and Banquet, both held during the week of Oct. 19th. Also be sure to visit our plant which will be open from 2 to 5 of that week.

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OHIO



RAILROAD BUYING

New York Central System has inquired for 50 locomotives, of which 25 are passenger type for New York Central Lines and 25 switching engines for its subsidiary, the Pittsburgh & Lake Erie.

Santa Fe has ordered one 4-6-4 type locomotive and one 4-8-4 type locomotive from Baldwin Locomotive Works.

Detroit & Toledo Shore Line has ordered two locomotives of 2-8-2 type from Lima Locomotive Works.

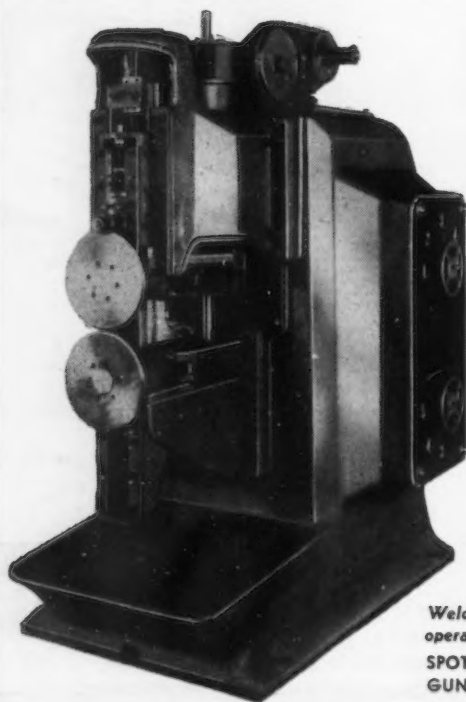
Kansas City Southern directors have tentatively approved an expenditure of \$4,000,000 for freight and passenger cars.

Chicago & Eastern Illinois has ordered 500 50-ton box cars from General American Transportation Corp.

Donora Southern is inquiring for 20 70-ton air dump cars.

Texas Co. is in the market for four 10,000-gal. tank cars.

Chesapeake & Ohio is inquiring for three combination passenger and baggage cars.



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Fonda, Johnstown & Gloversville has applied to Interstate Commerce Commission for permission to purchase 10 21-passenger transit type coaches.

New York, New Haven & Hartford has applied for permission to spend \$1,081,000 for equipping box cars with cast steel side frames.

Chicago & Eastern, through its trustee, Charles H. Thomson, has applied to Interstate Commerce Commission for authority to purchase 500 steel-sheathed 50-ton box cars with steel underframes and trucks of cast steel side frames. It is proposed to purchase the cars from General American Transportation Corp., Chicago, at \$2700 per car. Authority is also asked to issue equipment trust certificates in amount of 80 per cent of the purchase price.

Birmingham Southern has purchased five diesel-electric locomotives from Electro-Motive Corp., a division of General Motors Corp. This is in addition to an order for five similar locomotives recently placed with American Locomotive Co.

Cambria & Indiana is in the market for 300 hopper cars.

RAILS AND TRACK SUPPLIES

Central of Georgia has ordered 5000 tons of rails, 250,000 tie plates, 1600 kegs of bolts, and 3000 kegs of spikes from Tennessee Coal, Iron & Railroad Co.

Louisville & Nashville has ordered 27,000 tons of rails and about \$250,000 worth of track supplies from Tennessee Coal, Iron & Railroad Co.



...PIPE LINES...

A. O. Smith Corp., Milwaukee, has received an order for about 12,000 tons of 14-in. pipe for Cabot Gas Corp., Boston, for a 92-mile line to run from gas fields in northwestern Pennsylvania to plant of Eastman Kodak Co., Rochester, N. Y., which has contracted for natural gas service for three years. Line will run from gas field in Pennsylvania through Allegany, Wyoming, Livingston and Monroe counties, N. Y. Company has secured franchises to furnish natural gas to 19 municipalities in counties noted and will build welded steel pipe line branches from main line. Pavilion Gas Co., Pavilion, N. Y., near Rochester, has contracted for supply from Cabot company. Compressor stations will be built at points along route for booster and control service. Entire project will cost over \$1,500,000.

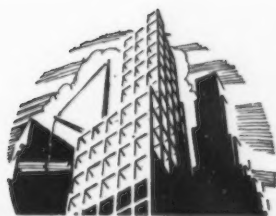
Vicksburg, Miss., has voted bonds for \$200,000, to be increased to \$335,000 by Federal aid, for welded steel pipe line from State-owned gas field near Jackson, to city limits, for natural gas transmission for municipal service. Distributing and control station will be built at last noted point.

Municipal Utilities, Inc., Eunice, La., will build welded steel pipe line from Tepetate gas field to Eunice, about 11 miles, for natural gas transmission. Pipe line distributing system will be installed in latter community. Company has contracted with Continental Oil Co. for gas supply from field noted. Cost close to \$75,000.

Grand Rapids Gas Light Co., Grand Rapids, Mich., plans welded steel pipe line from gas wells in Hinton-Belvidere-Millbrook field to gas field near New Haven, Mich., for natural gas transmission from latter district.

Tri-County Pipe Line Co., Garden City, Kan., plans 10-in. welded steel pipe line from gas field at Holcomb, Finney County, to Scott City, Kan., and vicinity, about 75 miles, for natural gas transmission. Cost over \$500,000 with booster stations and other operating facilities in communities served.

Bureau of Reclamation, Denver, asks bids until Oct. 20 for 31 1/4-in. inside diameter welded steel pipe and appurtenances for Ogden Canyon siphon on South Ogden high line canal, Ogden River project, Utah; also for structural steel, galvanized steel, cables and appurtenances for suspension bridge across Ogden River to support steel pipe siphon noted (Specifications 842-D).



...NEW YORK...

... Some mills sold up on sheets for the fourth quarter.

... Tin plate demand holds up beyond seasonal expectations.

... New York Central issues inquiry for 50 locomotives.

NEW YORK, Oct. 6. — Steel companies enter the fourth quarter with the largest volume of orders on their books in years. In fact, it is necessary to go back to such boom years as 1929 and 1920 to find a counterpart for the present situation in some products, notably sheets. A few mills can take no business in cold-rolled and light hot-rolled annealed sheets for the fourth quarter; others that are not entirely filled up are booking business for late November and through December, with prospects that they, too, will be out of the market before long. There was heavy buying just prior to the end of September of those products on which price advances were effective as of Oct. 1, but good business has not been confined to such products, but is fairly well spread over the entire list of products with only a few exceptions. Hot-rolled bar tonnage on mill books is so heavy that most mills are quoting deliveries of four to six weeks. Mills have had to turn down a good deal of business because of delivery promises that were unsatisfactory to buyers, but those losing the business are unaware as to whether better deliveries were obtainable elsewhere.

A surprising situation is that existing in tin plate. Usually at this time of the year production declines, but general line can business is apparently taking up most of the slack caused by the ending of the season for packers' cans, with the result that deliveries of tin plate are not improving materially.

The most striking news in the railroad equipment field in years

is the announcement by the New York Central that it will buy 50 locomotives, of which 25 are to be passenger engines for the parent road and 25 will be switching engines for the Pittsburgh & Lake Erie. The purchase of these locomotives has been under consideration for about two months, hence it



...BIRMINGHAM...

... New business continues at steady rate.

... Pig iron sales gain for fourth quarter.

BIRMINGHAM, Oct. 6.—There is let-up in the flow of new business. Foundries have been buying pig iron liberally for the fourth quarter and the furnaces now have a large amount of forward tonnage on their books. Steel buying, active for several months, still does not show any signs of abatement. Farm demand has grown lately with the marketing of crops.

The Louisville & Nashville Railroad has ordered 27,000 tons of rails and about \$250,000 worth of track supplies from the Tennessee Coal, Iron & Railroad Co. The Ensley rail mill will resume operations about Nov. 1 for an indefinite run.

Production is also continuing at a steady rate, with 10 active blast

is likely that the orders will not be long delayed.

Pig Iron

Forward buying is less pronounced, but carlot orders for prompt shipment continue to flow in regularly, and sellers consider the recession in aggregate tonnage booked during the week a normal tapering of demand following active fourth quarter sales. In view of strength in iron and steel generally, confidence as to the future is still evident. The advance last week of 50c. a ton in Lake Superior charcoal iron is indicative of this stronger demand.

Reinforcing Steel

About 1000 tons of bars was awarded this week, including 500 tons for several Connecticut bridges which went to Truscon Steel Co. and 300 tons for Triborough bridge work which was given to Fireproof Products Co. Disposition of the steel for a hospital at Northport, Long Island, requiring 700 tons of bars, is expected to be announced shortly, while highway projects in this district continue to provide a steady stream of small jobs. Little change in the price situation is reported. A public letting in which 14 companies submitted bids revealed that six were under the published price.

furnaces and 14 active open hearths scheduled for this week. For a part of last week there were 11 blast furnaces in operation. Woodward Iron operated three instead of two, preparatory to a change for relining one of its stacks.

New pipe tonnage is expected to be slightly larger in October than in September, as more bid openings are scheduled. September shipments of pressure pipe were about the same as those for August.

U. S. Engineer Office, Mobile, has announced that bids will be opened Oct. 28 for the construction of a new lock and dam on the Warrior River, near Tuscaloosa, Ala., to replace three existing sets of locks and dams. The project is expected to cost \$3,000,000.

Virginia Bridge Co. has booked 240 tons of structural steel for use in constructing the dam and pump house for Birmingham's industrial water supply system.

R. J. Reid, Birmingham, was low bidder for constructing three trestles on the railroad line of the Warrior River Terminal Co., running from Birmingham to the Warrior River. About 300 tons of structural steel will be required, which will be placed with Virginia Bridge Co. when the general contract is confirmed.

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Hemp Center
Wire Rope Center
Metallic Core
Seale - Filler Wire
Warrington



AWARDS

Cambridge, Mass., 100 tons, Radcliffe College unit, to Concrete Steel Co.

Hartford, Conn., 160 tons, grade crossing, to Truscon Steel Co.

State of Connecticut, 500 tons, highway bridges, to Truscon Steel Co.

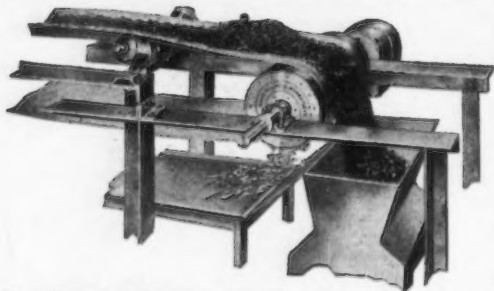
Linden, N. J., 800 tons, General Motors Corp. plant, to Taylor & Gaskin, Detroit.

New York, 300 tons, Triborough bridge, to Fireproof Products Co.

Montgomery County, N. Y., 100 tons, highway work, to Pittsburgh Steel Co.

Lehigh County, Pa., 100 tons, highway work, to Bethlehem Steel Co.

IRON PROBLEMS SOLVED



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MAGNETIC
SEPARATION

assuring great savings in tools when re-machining.

Iron in any form from the finest material to coarse tramp iron can be removed in the regular order of production.

Don't waste time and money because of iron troubles.

Come to Separation Headquarters.

DINGS MAGNETIC SEPARATOR CO.
727 Smith Street, Milwaukee, Wis.

Separation Headquarters Since 1899

Davenport, Iowa, 100 tons, apartment building, to Concrete Steel Co.

San Pedro, Cal., 1200 tons, Federal jail, to Soule Steel Co.

Los Angeles, 500 tons, West District high school, to Concrete Engineering Co.

Los Angeles, 550 tons, State bridge across Los Angeles River, to Soule Steel Co.

Santa Anna, Cal., 145 tons, State bridge over Santa Anna River, to Soule Steel Co.

NEW REINFORCING BAR PROJECTS

Deerfield-Sunderland, Mass., 300 tons, State road.

Malden-Saugus, Mass., 240 tons, State road.

Ashburnham, Mass., 190 tons, State road.

Millbury-Sutton, Mass., 126 tons, State road.

Worcester, Mass., 121 tons, State road.

Northport, N. Y., 700 tons, hospital; White Construction Co., general contractors.

State of Illinois, 250 tons, State highway work.

Chicago, tonnage being estimated, superstructure for Jane Addams housing project; bids Oct. 11.

Oakland, Cal., 167 tons, schedule A of Broadway low-level tunnel project; bids Oct. 16.

Los Angeles, 145 tons, Vermont Avenue school; bids opened.

Los Angeles, 365 tons, Western District junior high school buildings; bids Oct. 19.

Los Angeles, 390 tons, South Los Angeles junior high school; bids Oct. 23.

Los Angeles, 100 tons, upper feeder of Colorado River; bids Oct. 22.



....ST. LOUIS....

...Pig iron buying heavy
in September.

o o o

...Stove plants are unusually busy.

ST. LOUIS, Oct. 6.—The demand for sheets from the manufacturers of stoves in the St. Louis district is the brightest spot in the finished iron and steel market. In the Belleville district, the foundries making stoves and furnaces are all operating six days a week and have backlogs said to be the largest in years.

The buying of bars and sheets prior to the advance of \$2 a ton, which became effective last Thursday, was comparatively small and disappointing to the trade. It was felt that the saving to be effected by advance buying was not sufficient inducement for a speculative movement, and purchasing was confined to actual requirements.

A representative of one of the

mills reports that during a recent trip through Arkansas and Tennessee he heard much of a car shortage and the prospects for further purchases of cars to meet it.

Warehouse prices have been advanced in line with mills' increases which became effective Oct. 1. Engineering Construction Corp. of New York is low bidder on the dam at Alton, Ill.; the only new material to be purchased is 240 tons of reinforcing bars.

Buying of pig iron continues at a high rate. September was one of the best months of the year for sales. The melt in the district continues at a high rate.



... **Railroads ordering rails in quantity.**

... **Demand for pig iron and scrap active.**

TORONTO, Oct. 6.—Business is showing indications of further improvement in the Canadian iron and steel markets. Officials of Dominion Steel & Coal Corp., Sydney, N. S., state that an order has been received for 25,000 tons of steel rails. This will enable the company to resume operations in its rail mill and also stimulate activities in other sections of the plant. It is expected that similar contracts will be awarded the Algoma Steel Corp., Sault Ste. Marie, Ont. The mining industry, as well as the automotive branch, continues to furnish a big demand for steel, tools and general equipment, while there also is heavier call for other lines of steel from various consumers throughout Canada. Official announcement is made that the Steel Co. of Canada, Ltd., Hamilton, Ont., will construct immediately a new 150-ton open-hearth furnace, and also make other improvements to its plant. Iron and steel price lists are being revised upward, and new quotations are expected at an early date.

Demand for merchant pig iron is increasing steadily with awards for the past week, approximately 900 tons, made up of lots ranging from a car to 300 tons. Local blast furnace representatives also state that a few melters have covered for last quarter needs, and look for further business in the face of pending higher prices for pig iron. Iron production also is increasing, with

four stacks blowing and one banked.

Local iron and steel scrap dealers are preparing new lists, which will be released next week. In addition to revising prices upward, it is stated that the new lists will be more selective, carrying only those materials that are providing mar-

ket interest. At the present time there is a good demand for most lines of iron and steel scrap. Steel mills and other consumers in the Hamilton district are taking regular shipments of heavy melting and other steel grades at regular intervals, and there also is good call for steel scrap in Montreal.

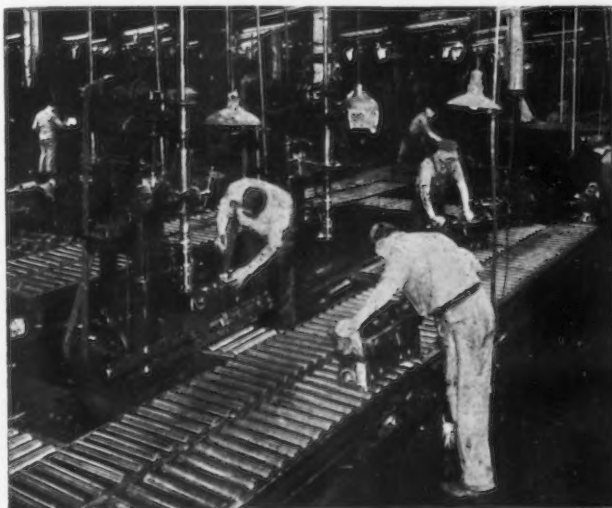
C. I. O. Progress in Steel Held Secret

AT a press conference Tuesday afternoon, John L. Lewis said he had no figures on the number of steel workers which his committee for industrial organization has organized. At the same time he gave out figures on the number he said the C. I. O. had organized in the automotive and rubber industries. The omission of figures on steel organization coupled with the release of automotive and rubber data were interpreted as admission that slow progress has been made by the Committee in organizing the steel industry. Lewis said the committee had organized 60,000 workers in the automotive industry, and that it had increased the union membership in the rubber industry

from 4000 in January to 28,000 in September.

He declared, however, that the Committee has ample funds to continue its drive in the steel industry, and mentioned that the Committee has 175 organizers at work in the steel industry. These workers are in addition to local organizers, it was stated.

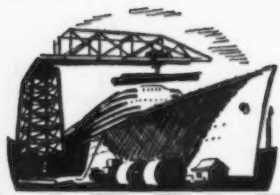
Lewis denied that efforts are being made by the C. I. O. to negotiate terms of peace with the American Federation of Labor in connection with the industrial-craft union row. He pointed out, however, that if President Green of the Federation wants to bring about peace he has only to rescind the order of the executive council of the Federation ousting the C. I. O. and its unions from the Federation and announcing that unions may proceed to organize industrially.



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The foundry industry is 3000 years old—the introduction of the *Continuous Flow Principle* of handling materials in foundries within the last few years is one of the radical changes made in foundry practice. Continuous flow multiplies production without increasing floor space. It is a proven way to cut obstinate production costs. Mathews Conveyer Systems for foundries prove this. Ask for the book "Problems Solved with Mathews Conveyer Systems."

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San Francisco, Calif. ELLWOOD CITY, PENNA. Port Hope, Ont., Can.



.. PHILADELPHIA ..

... Fourth quarter backlogs heavy.

... Deliveries still greatest problem of mills.

... Operations up fractionally to 55½ per cent.

PHILADELPHIA, Oct. 5.—Orders for the fourth quarter are being placed in slightly diminished volume from the pace of the past few weeks. Some sellers believe that good business is in prospect for the remainder of the year, while others expect a slump late in the year if the present Administration is continued in office.

As was the case during August and September, buyers continue to worry about deliveries rather than price. Backlogs represent eight or nine weeks' operations on some products.

By-product foundry coke has been advanced 50c. a ton. Buyers of both coal and coke are reported to be buying well in advance, owing partly to the wage situation in the coal fields, which comes to a head April 1, and to the fact that a seri-

ous shortage of code cars appears imminent.

Scrap holds steady pending the award of the Pennsylvania list, with buying seemingly confined to immediate requirements. Domestic pig iron sellers fear further foreign competition due to currency devaluation abroad.

Structural awards this week amounted to only a little more than 1000 tons, but over 4000 tons is to be disposed of before the end of the month.

District operations increased fractionally to 55½ per cent of capacity.

Pig Iron

Some sellers are of the opinion that, if operations continue at near their present level and scrap prices maintain their strength, there will

be a shortage of iron soon. Accordingly, additional furnaces in this territory may be placed in blast. Concern is felt, however, lest the current devaluation processes taking place in Europe make more profitable the importation of foreign iron than is already the case. It is said that many manufacturers of machinery and machine tools, of which Russia is a heavy buyer, are forced to take much of their payment in the form of pig iron. Regular buyers for the most part have anticipated their requirements for about a month in advance, so that most of the day to day buying is composed of carload orders or less for immediate use.

Sheets and Plates

Several mills in this district are now able to ship plates in less than 10 days, while the longest time required is from three to four weeks. Plate rollers have not yet begun to worry over the recent decrease in business, all confidently expecting increased ordering soon. Sheets continue in good demand with promises of delivery ranging from two weeks for heavy gages of hot-rolled material to eight and nine weeks for cold-rolled. Galvanized is requiring from three to eight weeks for delivery, while strip may be obtained generally in less than three weeks. Buying appears to be general, with no particular specifications dominant.

The contra-seasonal continuance of near capacity operations in tin plate mills is attributed almost wholly to current demand, rolling for 1937 not being expected to begin until after Nov. 1. Existing backlogs for tin plate run as high as seven weeks.

Shapes and Bars

Fall road work is responsible for most of the activity in this week's list of structural awards and projects pending. Bethlehem Steel Co. will furnish 980 tons of shapes for highway work in Juniata and Bedford counties, while Morris Wheeler Co. was awarded 120 tons for a warehouse in Philadelphia. Bids were taken Monday on two highway bridges, one at South Amboy, N. J., involving 550 tons, and the other, in Hudson County, requiring 1400 tons. Over 2000 tons of shapes will be required for various road projects, on which bids will be opened Oct. 16 at Harrisburg. Reinforcing bar awards included two 100-ton highway jobs—one in Lehigh County and the other in Montgomery County.

Wire Products

Consumers of wire products anticipated the advance in prices for

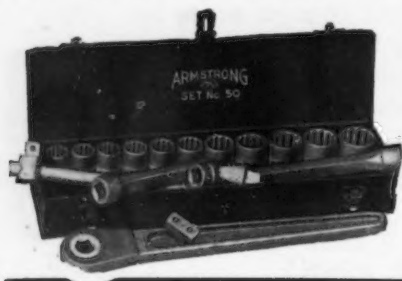
ARMSTRONG



Chrome-Vanadium SOCKETS

Here is a complete line of accurately made, finely finished sockets all standard sizes and types from tiny 5/32" miniatures to great 5" Bridge Wrench Sockets (not illustrated).

Unique to the ARMSTRONG Socket Wrench Sets is the patented Drivlock that locks socket to driver, driver to ratchet, and extension to extension—makes of each assembly a rigid tool that meets industrial requirements of strength and safety.



9 Types. All Sizes. Double Hex. and Double Square. Miniatures ¼" Drive; Light ⅜" Drive; Standard ½" Drive; Extra Deep ⅝" Drive; Straight Wall ¾" Sq. Drive; Heavy Duty ¾" Sq. Drive; Deep Heavy Duty ¾" Sq. Drive; Extra Heavy Duty 1" Hex. Drive.

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ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
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New York San Francisco London

fourth quarter sufficiently to cover their requirements for about a month in advance. Present demand, which is confined mostly to material needed for immediate use, is good. No difficulty is expected with the new prices, and good business is looked for over the next two to three months.

Imports

The following iron and steel imports were received here last week: 8100 tons of chrome ore from French Oceania; 1865 tons of pig iron from the Netherlands; 152 tons of sponge iron, 85 tons of cold drawn steel wire, 116 tons of steel tubes, 16 tons of steel forgings and 51 tons of steel bars from Sweden, and 24 tons of steel bars from Belgium.



...Pig iron price rise is expected.

o o o

...Sheet orders hold at high rate.

CINCINNATI, Oct. 6.—The possibility of a price increase on pig iron within 30 days is reported by furnace interests, and consumers are said to be preparing for anticipatory coverage. Inventories are not large. Foundry operations are slightly better than last week, the working week averaging a trifle over four days.

District sheet steel manufacturers report demand to be at the highest rate in the experience of local plants. Average bookings the past week exceeded mill capacity about 20 per cent, although all consuming interests are not yet fully in the market, refrigerator manufacturers being the outstanding absentees. Anticipatory buying is the rule, since users desire to be certain of material, and it is this situation that has added to the perplexities of mill operators. Shortest delivery is now three weeks, but on the same grades six weeks is the ruling delivery time. Rolling schedules are at full capacity on all units.

The district coke market is stronger. Foundry grades are moving on contract at a good rate. Prices on domestic sizes have been advanced 50 c. a ton, but foundry coke remains at \$9.50, delivered in Cincinnati.



... Fear of shipping tie-up affects business.

o o o

... Reinforcing bars are active.

SAN FRANCISCO, Oct. 5.—Though a 15-day extension of the 1934 agreement between longshoremen and shipowners was brought about at almost the exact minute of expiration through the efforts of a Federal commission, no new agreement, satisfactory to both factions, has yet been drawn up. Reports from authoritative sources indicate that the same crisis will again be faced on Oct. 15, with employers demanding arbitration in lieu of a definite agreement, and longshoremen thus far refusing such action. Fear of a general tie-up in shipping has kept the steel market sluggish with little indication of immediate life.

School projects in Los Angeles kept the reinforcing steel market comparatively active during the past week. The contract for 1200 tons of reinforcing bars involved

in the Federal Jail at San Pedro, Cal., was awarded to Soule Steel Co., which also took the contracts for 680 tons of bars to be used in the construction of two bridges in Los Angeles County.

Outstanding among new projects was the opening of bids on approximately 2700 tons of plates involved in the Industrial Water Pipe Line from Aberdeen, Wash., to Hoquiam. This project will require 32,000 lineal ft. of 54-in. pipe at an estimated cost of \$275,000.

Structural steel awards during the week aggregated 2100 tons, of which 845 tons was taken by Bethlehem Steel Co. An aggregate of 2824 tons of reinforcing bars was awarded, with the San Pedro Federal Jail accounting for nearly half of this total.

Jobbing sales have remained almost on a par with early summer activity and mills are operating near capacity in preparation for late fall and early winter projects, plans for many of which are under consideration now.

Sales by Caterpillar Tractor Co., Peoria, Ill., in August continued at more than 50 per cent ahead of the 1935 comparable figure. Income was 70 per cent above the corresponding month in 1935. Net sales for the 12 months to Aug. 31, were \$49,119,081, against \$31,687,076 in the preceding like period.

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INDUSTRIAL
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PERFORATING CO.**

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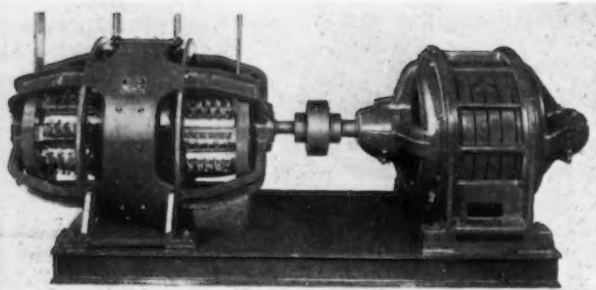
H & K industrial perforations embrace a range of sizes and shapes intended to meet the most exacting requirements of all industries.

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OPERATION
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STRIP PLATING
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SERVICE
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As modern as the newest continuous strip mills in which they are operating, Columbia Plating Generators offer many advanced features of design and construction which ideally fit them for this severe steel mill service.

Columbia Low-Voltage Generators are built in sizes of from 100 to 20,000 amperes. May we send you our illustrated bulletin, describing them?

COLUMBIA ELECTRIC MFG. CO.,
4523 Hamilton Ave. **Cleveland, Ohio**

COLUMBIA LOW VOLTAGE GENERATORS

Ferro Enamel Corp. To Use Fair Building

ONE of the major attractions at the Great Lakes Exposition in Cleveland, the Porcelain Enamel Building, is to become the permanent office building of the Ferro Enamel Corp., Cleveland, according to the Porcelain Enamel Institute.

It will be necessary to dismantle and re-erect the structure piece by piece. This will mean the removal of some 1200 porcelain enamel panels from the exterior of the building, and the identification of each individual piece, so that the conversion from an exhibition building into an office building may be completed without mishap. It will also be necessary to add insulation, windows in some places, a heating plant and interior partitions.

About 6000 sq. ft. of porcelain enameled panels constitute the exterior walls. These consist of three-ply board sandwiched between a galvanized steel backing and porcelain enamel face, and are screwed into place on the structural framework. It is believed that this structure is the largest of its type ever to be utilized as an office building.

Price of Carbides For Tools Reduced

USERS of carbide tools will be affected by reduced prices for Firthite sintered carbides, product of the Firth-Sterling Steel Co., McKeesport, Pa. The new low base price for Firthite blanks, effective Oct. 1, is 45c. a gram. Applying to all grades of Firthite tungsten carbide and other carbides, the reduction was made possible, according to a company announcement, due to the wider use of carbide tools during the past year. Firthite finished tool prices have also been lowered.

OBITUARY

(CONCLUDED FROM PAGE 99)

Oct. 6, 1866, and was approaching his 70th birthday. Since 1902 Mr. Linthicum had been connected with cast iron pipe manufacturing in Alabama. From 1902 to 1905 he was with the Anniston plant of the United States Cast Iron Pipe & Foundry Co., now the United States Pipe & Foundry Co. In 1905 he went to Birmingham and helped to organize the American Cast Iron Pipe Co. In 1909 he resigned from that company and then in 1912 organized the National Cast Iron Pipe Co., now a division of James B. Clow & Son, Chicago, serving as president continuously from the time it was established until his death.

♦ ♦ ♦

EDWARD J. ZAHNER, president of the Metal Door & Trim Co., LaPorte, Ind., died at that city on Sept. 23, aged 54 years. A native of Kansas City, Mr. Zahner was long identified with the hollow metal door industry. He worked as a young man for his father at the Zahner Mfg. Co. of Kansas City. In 1914 he became president of the Zahner Metal Sash & Door Co., Canton, Ohio. During the war he was associated with the Emergency Fleet Corp. In 1921 he helped reorganize and became president of the J. C. McFarland Co., LaPorte, which company in 1926 became the Metal Door & Trim Co.



*Do YOU know
the Answers?*

Count 20 points each for the correct answers to the following questions. Can you score 80? Don't look now, but the answers are on page 167.

1. All liquid fuels used in automobile engines are:

Esters Hydrocarbons
Neuresthenics Carbohydrates

2. You remember Madame Curie as:

An opera singer A style authority
Discoverer of radium
A French Aviatrix

3. Fuel lines in practically all American automobiles are made by _____

4. The largest island in the world is:

Borneo Madagascar
Greenland New Zealand

5. Japan is seriously menacing British dominance in one of these markets:

Fish and sea food Cotton textiles
Rubber Oil Copra

The Answer to Your Tubing Problem is
BUNDY TUBING
BUNDY TUBING CO. . . DETROIT



...NON-FERROUS...

... Consumption of zinc expands.

... Export copper moderates; tin stocks fall.

NEW YORK, Oct. 6.—Domestic copper sales were regular last week, but unstimulated by the opening of January books. Turnover for the week-end amounted to 1619 tons, and the month's total rose to 2638 tons through Saturday. Final tally on September bookings revealed a total of 40,769 tons, principally for delivery in December. No producer has changed the price, which therefore continues firm and steady

at 9.75c. a lb., Connecticut Valley. As a result of foreign currency devaluation and freer spot supplies in Europe, copper for export is less buoyant, the price having at length fallen to parity or near parity with the domestic quotation. Demand on the continent keeps to a steady level. Increase in the volume of domestic buying must await a further reduction in contracted tonnage or be actuated by renewal of fears about prices.

Lead

Lead sales continue to reflect an active interest in the market by leading consumers as well as smaller users. Above-average buying proceeds daily, and waiting lists of unfilled inquiry are still unreduced in some instances. With October covered except for customers who habitually buy for prompt shipment, November requirements are occupying the center of the stage. This position is generally estimated to be about 40 per cent sold. There is no change in the price of lead, which continues firm at the 4.45c. a lb. St. Louis basis. Sellers now think that September shipments will show a movement into consumption of between 51,000 and 53,000 tons. Refined stocks should reveal a drop of at least 12,000 to 13,000 tons.

Zinc

Routine buying of zinc in small volume prevailed again last week, but shipments rose markedly to upward of 7700 tons. Prime western grade continues to be absorbed readily by the active galvanizing industry, while banking of die castings against automotive needs is maintaining the demand for high-grade tonnage. The price for ordinary brands remains unchanged at 4.85c. a lb., East St. Louis, and no complications due to fluctuations in the foreign market are foreseeable at present. European cartel negotiations are unimproved in status.

Tin

Tin sellers in New York did an active business on the opening day of the month when 400 to 500 tons were sold. The rest of the week developed little or no interest from consumers in view of these purchases, but, though dull as to demand, the market's undertone remained firm. The price at which business was done on Oct. 1 was 45.62½c. a lb. for spot Straits, compared with a level today of about 45.37½c. Stimulated by strong tin plate operations, producers in the industry were dominant buyers during the recent trading spree. A further incentive may have been furnished by September statistics which showed that world stocks at the month's end were only 13,587 tons of tin. United States deliveries were 6200 tons and world deliveries 9722 tons, a gain over August in each instance.

Non-Ferrous Averages

	Sept. aver.
Electrolytic copper, Conn.	9.750c. a lb.
Lake copper, Eastern delivery	9.875c. a lb.
Straits tin, spot, N. Y.	44.765c. a lb.
Zinc, East St. Louis.	4.850c. a lb.
Zinc, New York.	5.225c. a lb.
Lead, St. Louis.	4.450c. a lb.
Lead, New York.	4.600c. a lb.

The Week's Prices. Cents Per Pound for Early Delivery

	Sept. 30	Oct. 1	Oct. 2	Oct. 3	Oct. 5	Oct. 6
Electrolytic copper, Conn.*	9.75	9.75	9.75	9.75	9.75	9.75
Lake copper, N. Y.	9.87½	9.87½	9.87½	9.87½	9.87½	9.87½
Straits tin, Spot, New York.	46.00	45.62½	45.45	45.45	45.65	45.37½
Zinc, East St. Louis.	4.85	4.85	4.85	4.85	4.85	4.85
Zinc, New York†.	5.22½	5.22½	5.22½	5.22½	5.22½	5.22½
Lead, St. Louis.	4.45	4.45	4.45	4.45	4.45	4.45
Lead, New York.	4.60	4.60	4.60	4.60	4.60	4.60

* Delivered Connecticut Valley; price ¼c. lower delivered in New York.
† Includes emergency freight charge.

Aluminum, virgin 99 per cent plus 19.00c.-21.00c. a lb. delivered.
Aluminum, No. 12 remelt No. 2 standard, in carloads, 16.50c. a lb. delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 12.50c. a lb., New York.
Quicksilver, \$88.00 to \$92.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 9.75c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig.	46.75c. to 47.75c.
Tin, bar.	48.75c. to 49.75c.
Copper, Lake.	10.75c. to 11.75c.
Copper, electrolytic.	10.75c. to 11.75c.
Copper, castings.	10.50c. to 11.50c.
*Copper sheets, hot-rolled.	17.50c.
*High brass sheets.	15.62½c.
*Seamless brass tubes.	17.87½c.
*Seamless copper tubes.	18.00c.
*Brass rods.	13.62½c.
Zinc, slabs.	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over.	10.25c.
Lead, American pig.	5.10c. to 6.10c.
Lead, bar.	6.10c. to 7.10c.
Lead, Sheets, cut.	8.25c.
Antimony, Asiatic.	13.00c. to 14.00c.
Alum., virgin, 99 per cent plus.	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent.	18.50c. to 20.00c.
Solder, ½ and ¾.	28.50c. to 29.50c.
Babbitt metal, commercial grades.	25.00c. to 60.00c.

* These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33¼ per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.	49.75c.
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Tin, bar.	51.75c.
Copper, Lake.	10.75c. to 11.00c.
Copper, electrolytic.	10.75c. to 11.00c.
Copper, castings.	10.50c. to 10.75c.
Zinc, slabs.	6.50c. to 6.75c.
Lead, American pig.	5.20c. to 6.50c.
Lead, bar.	8.50c.
Antimony, Asiatic.	15.50c.
Babbitt metal, medium grade.	19.00c.
Babbitt metal, high grade.	52.75c.
Solder, ½ and ¾.	26.75c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.	7.50c.	8.25c.
Copper, hvy. and wire.	7.37½c.	7.87½c.
Copper, light and bottoms.	6.37½c.	6.87½c.
Brass, heavy.	4.25c.	4.87½c.
Brass, light.	3.50c.	4.25c.
Hvy. machine composition.	6.25c.	6.75c.
No. 1 yel. brass turnings.	5.25c.	5.75c.
No. 1 red brass or compos. turnings.	5.87½c.	6.37½c.
Lead, heavy.	3.62½c.	4.00c.
Sheet aluminum.	13.25c.	14.75c.
Zinc.	2.50c.	2.87½c.
Cast aluminum.	12.12½c.	13.25c.



IRON AND STEEL SCRAP

... Composite price unchanged at \$16.75 a gross ton.

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... Pending Pennsylvania list expected to clarify prices.

FOR the third consecutive week heavy melting steel prices in the country's three major consuming areas have remained unchanged. Consequently THE IRON AGE composite figure is unaltered at \$16.75. Although there has been little or no consumer support over the past several weeks prices have failed to develop a serious undertone of weakness. Evidently those brokers who hold accumulations are convinced that mill operations will not decline and that their position will be either sustained or even improved over the remainder of the year. On the other hand, mills in certain areas prophesy moderate downward revisions in quotations. This conflicting attitude will be clarified to some extent when bids are opened this week on a large Pennsylvania Railroad monthly scrap list.

Pittsburgh

The market here is marking time with no large purchases having been made over the past week by either brokers or consumers. It is understood that the situation in regard to No. 2 steel at Youngstown has changed. Limitations on shipments have been removed and material is moving briskly into consumers' plants. While No. 2 is plentiful in the Pittsburgh district, this condition in view of the Youngstown situation will change shortly. Meanwhile, No. 2 is weaker at \$16 to \$16.50. In view of the strong undertone in No. 1 steel this grade remains quotable at \$18 to \$18.50. Present ranges will be clarified after railroad lists, which are being bid upon this week, are out of the way. Meanwhile, in view of the high operating rate, brokers continue optimistic.

Chicago

There is less rush on the part of consumers to make new commitments, but when they do enter the market they pay top prices. Heavy melting steel is moving at \$16.50 a ton, delivered, and dealers are being forced

to pay very close to that figure for tonnages to be applied against old commitments. Steel mills are accepting large shipments and no complaint is heard about limitations of unloading tracks. October promises to be a heavy month for boat shipments, a number of cargoes of borings and turnings being scheduled to leave Chicago for Lake Erie points. Brokers are inclined to look for a steady price structure and a quiet market for the next two to three weeks.

Cleveland

There is a lull in new consumer demand, but prices are steady, the market being stabilized for the time being at the quotations of a week ago when reductions of 50c. a ton were noted on steel-making grades. Mills have held up shipments of machine shop turnings to the Valley district as this material was coming in faster than wanted. Blast furnace scrap is not plentiful and is very firm. Brokers are paying \$11 for this scrap for delivery to Cleveland consumers.

Philadelphia

The eyes of the scrap trade are focused on the Pennsylvania list of about 35,000 tons, including 11,000 tons of No. 1 steel, which will be closed for bids after Wednesday. The market has held steady the last two weeks, apparently not being sure whether the next move would be up or down. The outcome of the bidding on the Pennsylvania scrap, however, is expected to determine the trend. If there should be an easing off in prices, the general level will likely not be lowered substantially unless operations drop sharply. The current price being offered by leading brokers in this area for No. 1 steel, \$15.50, is ample to secure quantities of scrap.

Buffalo

The market continues strong with a sale of 2000 tons of No. 1 and No. 2 steel made at \$16 and \$15 respectively. Other sales of smaller tonnages of No. 1 have been made at \$16.50, including a tonnage delivered to a local mill from Canada. Several brokers

are offering \$16 for No. 1 steel to fill old orders. A substantial sale of borings and turnings is reported to have been made at \$10.25 or \$10.50. Stove plate was sold during the week at \$12.50 to \$13.00.

Boston

The scrap situation, so far as it relates to Pennsylvania shipments, has become inactive. Brokers generally feel the recent advance was too rapid to be healthy, and in making offers for material now have reduced prices 50c. a ton or more. Buyers are of the opinion the longer they hold off the more likely they are to pay less. Nonetheless, owners of material are still not inclined to sell. Brokers still have unfilled contracts, some taken at prices below current nominal quotations. In contrast, exporters are buying sparingly at former prices, and New England foundries are taking machinery cast quite freely at old quotations.

New York

While Eastern mills are not buying so freely as a fortnight ago, the undertone in the New York market is a shade stronger than last week. Dealers and brokers are paying the same prices for heavy melting steels as prevailed last week and the week before, but are now offering 25c. more for No. 2 cast at \$11 a gross ton and 50c. more for stove plate at \$10. Schiavone-Bonomo Corp. received the award of nine Government vessels at a bid of \$116,250 for the lot.

Detroit

This market is definitely softer and principal grades have eased off 25c. a ton with the exception of hydraulic compressed sheets. Deliveries of scrap in this area have been very light, although there have been a number of important purchases on the part of out of town mills during the past week. A sizable list issued by Chevrolet is to be closed on Thursday, and bids submitted should indicate the price trend. Most brokers are still fairly bullish and believe that sustained mill operations will keep up with the increased scrap supply as the automobile plants get into full swing on 1937 production.

St. Louis

Mills in this district are said to be withholding the placing of new orders on account of weakness in the market in Eastern centers. The market here is easier on No. 2 steel, but No. 1 grades are still scarce and firm. Prices are unchanged.

Cincinnati

The district old materials market is quiet. Mills, following a short flurry a fortnight ago, have backed away and pressure for scrap has eased. Dealers' bids, however, are unchanged. Current business is in small lots. Supplies, since upward price trends have halted, are easier.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$18.00 to \$18.50
No. 2 hvy. mltng. steel.	16.00 to 16.50
No. 2 RR. wrought.	18.00 to 18.50
Scrap rails	18.25 to 18.75
Rails, 3 ft. and under.	19.50 to 20.00
Comp. sheet steel	18.00 to 18.50
Hand bundled sheets.	17.00 to 17.50
Hvy. steel axle turn.	16.50 to 17.00
Machine shop turn.	12.50 to 13.00
Short shov. turn.	12.50 to 13.00
Mixed bor. & turn.	11.50 to 12.00
Cast iron borings	12.50 to 13.00
Cast iron carwheels.	17.00 to 17.50
Hvy. breakable cast.	14.50 to 15.00
No. 1 cast	16.00 to 16.50
RR. knuckles & cplrs.	20.50 to 21.00
Rail coil & leaf springs	20.50 to 21.00
Rolled steel wheels.	20.50 to 21.00
Low phos. billet crops.	21.00 to 21.50
Low phos. sh. bar.	20.50 to 21.00
Low phos. punchings.	20.00 to 20.50
Low phos. plate scrap.	20.00 to 20.50
Steel car axles	19.50 to 20.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$15.00 to \$15.50
No. 2 hvy. mltng. steel.	14.00 to 14.50
Comp. sheet steel	14.50 to 15.00
Light bund. stampings	11.00 to 11.50
Drop forge flashings.	14.00 to 14.50
Machine shop turn.	10.00 to 10.50
Short shov. turn.	10.50 to 11.00
No. 1 busheling	14.00 to 14.50
Steel axle turnings.	11.00 to 11.50
Low phos. billet crops	19.00 to 19.50
Cast iron borings	10.50 to 11.00
Mixed bor. & turn.	10.50 to 11.00
No. 2 busheling	10.50 to 11.00
No. 1 cast	16.75 to 17.25
Railroad grate bars.	9.00 to 9.50
Stove plate	9.00 to 9.50
Rails under 3 ft.	19.00 to 19.50
Rails for rolling	16.50 to 17.00
Railroad malleable	17.75 to 18.00
Cast iron carwheels.	15.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$15.50 to \$16.00
No. 2 hvy. mltng. steel.	14.00 to 14.50
Hydraulic bund., new.	15.00 to 15.50
Hydraulic bund., old.	12.50 to 13.00
Steel rails for rolling.	17.00 to 17.50
Cast iron carwheels.	16.50 to 17.00
Hvy. breakable cast.	15.50 to 16.00
No. 1 cast	16.50 to 17.00
Stove plate (steel wks.)	12.50 to 13.00
Railroad malleable	16.50
Machine shop turn.	9.50 to 10.00
No. 1 blast furnace.	8.50 to 9.00
Cast borings	8.00 to 8.50
Heavy axle turnings.	12.50 to 13.00
No. 1 low phos. hvy.	18.50 to 19.00
Couplers & knuckles.	19.00 to 19.50
Rolled steel wheels.	19.00 to 19.50
Steel axles	20.50 to 21.00
Shafting	20.50 to 21.00
No. 1 RR. wrought.	15.50 to 16.00
Spec. iron & steel pipe.	13.00 to 13.50
Bundled sheets	14.00 to 14.50
No. 1 forge fire	14.50 to 15.00
Cast borings (chem.)	10.50 to 13.00

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton	
Hvy. mltng. steel.	\$16.00 to \$16.50
Auto. hvy. mltng. steel.	14.00 to 14.50
Shoveling steel	16.00 to 16.50
Hydraul. comp. sheets.	15.00 to 15.50
Drop forge flashings.	13.50 to 14.00
No. 1 busheling	14.75 to 15.25
Rolled carwheels	18.00 to 18.50
Railroad tires, cut	18.00 to 18.50
Railroad leaf springs.	17.50 to 18.00
Axle turnings	15.00 to 15.50
Steel coup. & knuckles	18.00 to 18.50
Coil springs	19.00 to 19.50
Axle turn. (elec.)	16.00 to 16.50
Low phos. punchings.	18.75 to 19.25
Low phos. plates, 12 in. and under	18.75 to 19.25
Cast iron borings	9.00 to 9.50
Short shov. turnings.	10.00 to 10.50
Machine shop turn.	8.50 to 9.00
Rerolling rails	17.00 to 17.50
Steel rails under 3 ft.	17.00 to 17.50
Steel rails under 2 ft.	18.50 to 19.00
Angle bars, steel	18.00 to 18.50
Cast iron carwheels	16.50 to 17.00
Railroad malleable	18.50 to 19.00
Agric. malleable	15.00

Per Net Ton

Iron car axles	\$18.50 to \$19.00
Steel car axles	17.75 to 18.25
No. 1 RR. wrought.	14.25 to 14.75

No. 2 RR. wrought.	\$14.25 to \$14.75
No. 2 busheling, old.	6.00 to 6.50
Locomotive tires	13.00 to 13.50
Pipes and flues	8.50 to 9.00
No. 1 machinery cast.	14.00 to 14.50
Clean auto. cast	13.00 to 13.50
No. 1 railroad cast.	13.50 to 14.00
No. 1 agric. cast.	11.00 to 11.50
Stove plate	8.75 to 9.25
Grate bars	9.50 to 10.00
Brake shoes	10.50 to 11.00

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel.	\$16.00 to \$16.50
No. 2 hvy. mltng. steel.	14.50 to 15.00
Scrap rails	16.00 to 16.50
New hy. b'ndled sheets	14.50 to 15.00
Old hydraul. bundles	13.00 to 13.50
Drop forge flashings.	14.50 to 15.00
No. 1 busheling	14.25 to 15.00
Hvy. axle turnings.	10.50 to 11.00
Machine shop turn.	8.50 to 9.00
Knuckles & couplers.	18.50 to 19.00
Coil & leaf springs.	18.50 to 19.00
Rolled steel wheels.	18.50 to 19.00
Low phos. billet crops.	18.50 to 19.00
Short shov. turnings.	9.75 to 10.25
Mixed Bor. & turn.	9.75 to 10.25
Cast iron borings	9.75 to 10.25
No. 2 busheling	11.00 to 11.50
Steel car axles	17.00 to 17.50
Iron axles	12.00 to 12.50
No. 1 machinery cast.	15.00 to 15.50
No. 1 cupola cast	14.50 to 15.00
Stove plate	12.50 to 13.00
Steel rails under 3 ft.	17.50 to 18.00
Cast iron carwheels.	15.50 to 16.00
Railroad malleable	17.00 to 18.00
Chemical borings	10.50 to 11.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel.	\$11.50
Scrap steel rails	\$12.00 to 12.50
Short shov. turnings.	8.00
Stove plate	8.00
Steel axles	13.50 to 14.00
Iron axles	13.50 to 14.00
No. 1 RR. wrought.	8.50 to 9.00
Rails for rolling	13.50 to 14.00
No. 1 cast	12.50
Tramcar wheels	12.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. steel.	\$14.50 to \$15.00
No. 1 hvy. melting.	14.25 to 14.75
No. 2 hvy. melting.	12.50 to 13.00
No. 1 locomotive tires.	13.50 to 14.00
Misc. stand.-sec. rails.	15.00 to 15.50
Railroad springs	16.00 to 16.50
Bundled sheets	9.50 to 10.00
No. 2 RR. wrought	14.50 to 15.00
No. 1 busheling	8.50 to 9.00
Cast bor. & turn.	5.50 to 6.00
Rails for rolling	15.75 to 16.25
Machine shop turn.	4.00 to 4.50
Heavy turnings	10.50 to 11.00
Steel car axles	16.00 to 16.50
Iron car axles	17.00 to 17.50
No. 1 RR. wrought.	12.50 to 13.00
Steel rails under 3 ft.	16.00 to 16.50
Steel angle bars	15.50 to 16.00
Cast iron carwheels.	12.75 to 13.25
No. 1 machinery cast.	12.50 to 13.00
Railroad malleable	15.00 to 15.50
No. 1 railroad cast.	12.50 to 13.00
Stove plate	7.50 to 8.00
Agricul. malleable	12.50 to 13.00
Grate bars	9.00 to 9.50
Brake shoes	11.25 to 11.75

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	\$13.50 to \$14.00
No. 2 hvy. mltng. steel.	11.00 to 11.50
Scrap rails for mltng.	14.00 to 14.50
Loose sheet clippings.	8.50 to 9.00
Bundled sheets	10.50 to 11.00
Cast iron borings	6.50 to 7.00
Machine shop turn.	7.50 to 8.00
No. 1 busheling	11.00 to 11.50
No. 2 busheling	6.75 to 7.25
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires.	12.50 to 13.00
Short rails	17.00 to 17.50
Cast iron carwheels.	13.50 to 14.00
No. 1 machinery cast.	14.00 to 14.50
No. 1 railroad cast.	13.50 to 14.00
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Agricul. malleable	12.50 to 13.00
Railroad malleable	15.00 to 15.50

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	\$13.75 to \$14.25
No. 2 hvy. mltng. steel.	12.75 to 13.25
Borings and turnings.	9.00 to 9.50

Long turnings	\$9.00 to \$9.50
Short shov. turnings.	10.25 to 10.75
No. 1 machinery cast.	14.50 to 15.00
Automotive cast	14.50 to 15.00
Hydraul. comp. sheets.	14.50 to 15.00
Stove plate	8.50 to 9.00
New factory bushel.	13.25 to 13.75
Old No. 2 busheling	8.50 to 9.00
Sheet clippings	10.25 to 10.75
Flashings	12.75 to 13.25
Low phos. plate scrap.	14.00 to 14.50

CANADA

Dealers' buying prices per gross ton:

	Toronto	Mon-treal
Hvy. melting steel.	\$7.50	\$7.00
Rails, scrap	8.50	8.00
Machine shop turn.	4.00	4.00
Boiler plate	7.00	6.00
Hvy. axle turnings.	4.50	4.00
Cast borings	5.00	4.50
Steel borings	4.00	4.00
Wrought pipe	4.00	4.00
Steel axles	8.50	9.00
Axles, wrought iron.	9.00	9.50
No. 1 machinery cast.	11.50	11.00
Stove plate	7.50	7.00
Standard carwheels	11.00	10.50
Malleable	7.00	7.00
Shoveling steel	6.50	6.00
Bushellings	6.00	5.50
Compressed sheets	6.50	6.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$17.00 to \$17.50
Hydraulic bundles	16.50 to 17.00
Machine shop turn.	12.00 to 12.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	\$11.75 to \$12.25
No. 2 hvy. mltng. steel.	10.75 to 11.25
Hvy. breakable cast.	11.50 to 12.00
No. 1 machinery cast.	12.00 to 12.50
No. 2 cast	10.50 to 11.00
Stove plate	9.50 to 10.00
Steel car axles	16.00 to 17.00
Shafting	15.00 to 16.00
No. 1 RR. wrought	12.00 to 12.50
No. 1 wrought long.	11.00 to 11.50
Spec. iron & steel pipe	10.50 to 11.00
Forge fire	8.00 to 8.50
Rails for rolling	11.00 to 11.50
Short shov. turnings.	5.75 to 6.25
Machine shop turn.	6.25 to 6.50
Cast borings	6.25 to 6.50
No. 1 blast furnace.	5.00 to 5.50
Cast borings (chem.)	10.00 to 11.00
Unprepar. yard scrap.	6.50 to 7.00

Per gross ton, delivered local foundries:

No. 1 machn. cast.	\$14.00 to \$14.50
No. 1 hvy. cast cupola.	11.50 to 12.00
No. 2 cast	10.50 to 11.00

Add 25c. to 50c. to above quotations to secure North Jersey prices.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	\$11.40 to \$11.90
Scrap rails	11.90 to 12.15
No. 2 steel	10.40 to 10.90
Breakable cast	10.00 to 10.25
Machine shop turn.	6.50 to 6.65
Bund. skeleton long.	10.25 to 10.50
Shafting	15.25 to 15.75
Cast bor. chemical.	5.00 to 7.00

Per gross ton delivered consumers' yards:

Textile cast	\$12.00 to \$13.50
No. 1 machine cast	12.00 to 13.50
Stove plate	9.50 to 10.00

EXPORT

Brokers' buying prices per gross ton:

New York, delivered alongside barges	
No. 1 hvy. mltng. steel.	\$11.50 to \$12.00
No. 2 hvy. mltng. steel.	10.50 to 11.00
No. 2 cast	10.00
Stove plate	9.25
Rails (scrap)	11.50 to 12.00

Boston, on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	\$12.00 to \$12.50
No. 2 hvy. mltng. steel.	11.00 to 11.50
Rails (scrap)	12.50 to 12.75
Stove plate	7.75 to 8.00
Machine shop turn.	6.00 to 6.25

New Orleans, on cars at

Stuyvesant Dock	
No. 1 hvy. mltng. steel.	\$12.60 to \$12.75
No. 2 hvy. mltng. steel.	11.60 to 11.75

Los Angeles, on cars or trucks

at local piers	
No. 1 hvy. mltng. steel.	\$10.50 to \$11.00
Compressed bundles	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are \$2 a ton higher, and delivered Detroit \$3 higher.

Per Gross Ton

Rerolling \$32.00
Forging quality 39.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open-hearth or Bessemer..... \$32.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared 1.80c.

Wire Rods

(No. 5 to 15/32 in.)

Per Gross Ton

F.o.b. Pittsburgh or Cleveland \$40.00
F.o.b. Chicago, Youngstown or Anderson, Ind. 41.00
F.o.b. Worcester, Mass. 42.00
F.o.b. Birmingham 43.00
F.o.b. San Francisco 49.00
F.o.b. Galveston 46.00

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.

F.o.b. Pittsburgh 2.05c.
F.o.b. Chicago or Gary 2.10c.
F.o.b. Duluth 2.20c.
Del'd Detroit 2.20c.
F.o.b. Cleveland 2.10c.
F.o.b. Buffalo 2.15c.
Del'd Philadelphia 2.36c.
Del'd New York 2.40c.
F.o.b. Birmingham 2.20c.
F.o.b. cars dock Gulf ports... 2.45c.
F.o.b. cars dock Pacific ports... 2.60c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh 1.90c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill. 1.95c.
F.o.b. Buffalo 2.00c.
F.o.b. Birmingham 2.05c.
F.o.b. cars dock Gulf ports... 2.30c.
F.o.b. cars dock Pacific ports... 2.45c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh 2.05c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 2.10c.
Del'd Detroit 2.20c.
F.o.b. cars dock Gulf ports... 2.45c.
F.o.b. cars dock Pacific ports.. 2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh 1.90c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 1.95c.
F.o.b. cars dock Gulf ports... 2.30c.
F.o.b. cars dock Pacific ports. 2.30c.

Iron

F.o.b. Chicago 1.80c.
F.o.b. Pittsburgh (refined) ... 2.10c.
Delivered New York 2.05c.
Delivered Philadelphia 2.10c.

Cold Finished Bars and Shafting*

Base per Lb.

F.o.b. Pittsburgh 2.35c.
F.o.b. Cleveland, Chicago and Gary 2.40c.
F.o.b. Buffalo 2.45c.
Del'd Detroit 2.50c.
Del'd eastern Michigan 2.55c.

*In quantities of 10,000 to 19,999 lb.

Plates

Base per Lb.

F.o.b. Pittsburgh 1.90c.
F.o.b. Chicago or Gary 1.95c.
Del'd Cleveland 2.095c.
F.o.b. Coatesville or Spar. Pt. 2.00c.
Del'd Philadelphia 2.09c.
Del'd New York 2.19c.
F.o.b. Birmingham 2.05c.
F.o.b. cars dock Gulf ports... 2.30c.
F.o.b. cars dock Pacific ports.. 2.45c.
Wrought iron plates, f.o.b. Pittsburgh 3.20c.

Floor Plates

F.o.b. Pittsburgh 3.45c.
F.o.b. Chicago 3.50c.
F.o.b. Coatesville 3.55c.
F.o.b. cars dock Gulf ports... 3.85c.
F.o.b. cars dock Pacific ports.. 4.00c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh 1.90c.
F.o.b. Chicago 1.95c.
Del'd Cleveland 2.095c.
F.o.b. Buffalo or Bethlehem... 2.00c.
Del'd Philadelphia 2.115c.
Del'd New York 2.1625c.
F.o.b. Birmingham (standard) 2.05c.
F.o.b. cars dock Gulf ports... 2.30c.
F.o.b. cars dock Pacific ports.. 2.45c.

Steel Sheet Piling

Base per Lb.

F.o.b. Pittsburgh 2.25c.
F.o.b. Chicago or Buffalo..... 2.35c.
F.o.b. cars dock Gulf or Pacific Coast ports 2.70c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb per gross ton.....\$36.37½
Angle bars, per 100 lb. 2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton\$35.00
Light rails (from rail steel) per gross ton 34.00

Base per 100 Lb.

Spikes 2.75c.
Tie plates, steel 2.00c.
Tie plates, Pacific Coast ports.. 2.10c.
Track bolts, to steam railroads. 3.75c.
Track bolts, to jobbers, all sizes (per 100 counts) 70 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE,

TERNE PLATE

Sheets

Hot Rolled

Base per Lb.

No. 10, f.o.b. Pittsburgh 1.95c.
No. 10, f.o.b. Gary 2.05c.
No. 10, del'd Detroit 2.15c.
No. 10, del'd Philadelphia 2.26c.
No. 10, f.o.b. Birmingham 2.10c.
No. 10, f.o.b. cars dock Pacific ports 2.50c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh 2.60c.
No. 24, f.o.b. Gary 2.70c.
No. 24, del'd Detroit 2.80c.
No. 24, del'd Philadelphia 2.91c.
No. 24, f.o.b. Birmingham 2.75c.
No. 24, f.o.b. cars dock Pacific ports 3.25c.
No. 24, wrought iron, Pittsburgh 4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh... 2.60c.
No. 10 gage, f.o.b. Gary 2.70c.
No. 10 gage, f.o.b. Detroit 2.80c.
No. 10 gage, del'd Philadelphia.. 2.91c.
No. 10 gage, f.o.b. Birmingham.. 2.75c.
No. 10 gage, f.o.b. cars dock Pacific ports 3.20c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh.. 3.05c.
No. 20 gage, f.o.b. Gary 3.15c.
No. 20 gage, del'd Detroit 3.25c.
No. 20 gage, del'd Philadelphia.. 3.36c.
No. 20 gage, f.o.b. Birmingham.. 3.20c.
No. 20 f.o.b. cars dock Pacific ports 3.60c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh.. 3.20c.
No. 24, f.o.b. Gary 3.30c.
No. 24, del'd Philadelphia 3.51c.
No. 24, f.o.b. Birmingham 3.35c.
No. 24, f.o.b. cars dock Pacific ports 3.80c.
No. 24, wrought iron, Pittsburgh 4.95c.

Electrical Sheets

(F.o.b. Pittsburgh)

Base per Lb.

Field grade 3.00c.
Armature 3.35c.
Electrical 3.85c.
Special Motor 4.90c.
Special Dynamo 5.60c.
Transformer 6.10c.
Transformer Special 7.10c.
Transformer Extra Special... 7.60c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras, plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh 3.50c.
F.o.b. Gary 3.60c.
F.o.b. cars dock Pacific ports.. 4.20c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh 3.05c.
No. 20, f.o.b. Gary 3.15c.
No. 20, f.o.b. Birmingham' 3.65c.
No. 20, f.o.b. cars dock Pacific ports 3.65c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh 2.75c.
No. 28, Gary 2.85c.
No. 28, cars dock Pacific ports. 3.35c.

Tin Plate

Base per Box

Standard cokes, f.o.b. Pittsburgh district mill\$5.25
Standard cokes, f.o.b. Gary..... 5.35

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.....\$10.00
15-lb. coating I.C..... 12.00
20-lb. coating I.C..... 13.00
25-lb. coating I.C..... 14.00
30-lb. coating I.C..... 15.25
40-lb. coating I.C..... 17.50

Hot-Rolled Hoops, Bands, Strips and

Flats under ¼ in.

Base per Lb.

All widths up to 24 in., P'gh. 1.95c.
All widths up to 24 in., Chicago. 2.05c.
All widths up to 24 in., del'd Detroit 2.15c.
All widths up to 24 in., Birmingham 2.10c.
Cooperage stock, Pittsburgh... 2.05c.
Cooperage stock, Chicago..... 2.15c.

Cold-Rolled Strips*

Base per Lb.

F.o.b. Pittsburgh 2.60c.
F.o.b. Cleveland 2.60c.
Del'd Chicago 2.895c.
F.o.b. Worcester 2.80c.

* Carbon 0.25 and less.

Cold-Rolled Spring Steel

Pittsburgh

and

Cleveland Worcester

Carbon 0.25-0.50% 2.60c. 2.80c.
Carbon .51-.75 3.70c. 3.90c.
Carbon .76-1.00 5.45c. 5.65c.
Carbon Over 1.00 7.50c. 7.70c.

Fender Stock

No. 14, Pittsburgh or Cleveland. 2.90c.
No. 14, Worcester 3.30c.
No. 20, Pittsburgh or Cleveland. 3.30c.
No. 20, Worcester 3.70c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

Bright wire2.50c.
Spring wire3.05c.

Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.

To the Trade

Standard wire nails\$2.05
Smooth coated nails2.05

Base per 100 Lb.

Annealed fence wire\$2.80
Galvanized fence wire3.15
Polished staples2.75
Galvanized staples3.00
Barbed wire, galvanized2.55
Twisted barless wire2.55
Woven wire fence, base column60
Single loop bale ties, base column52

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are \$3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

In.	Steel Black Galv.	In.	Wrought Iron Black Galv.
1/4	57	37	1/4
1/2	60	44 1/2	1/2
3/4	64 1/2	55	3/4
1	67 1/2	59	1
1 1/4	69 1/2	61 1/2	1 1/4

Lap Weld

In.	Steel Black Galv.	In.	Wrought Iron Black Galv.
2	62	53 1/2	2
2 1/2	3.65	56 1/2	2 1/2
3 1/2	6.67	58 1/2	3 1/2
7	8.66	56 1/2	7
9	10.65 1/2	56	9
11	12.64 1/2	55	11

Butt Weld, extra strong, plain ends

In.	Steel Black Galv.	In.	Wrought Iron Black Galv.
1/4	55 1/2	42 1/2	1/4
1/2	57 1/2	46 1/2	1/2
3/4	62 1/2	54 1/2	3/4
1	66 1/2	58 1/2	1
1 1/4	68	61	1 1/4

Lap Weld, extra strong, plain ends

In.	Steel Black Galv.	In.	Wrought Iron Black Galv.
2	60	52 1/2	2
2 1/2	3.64	56 1/2	2 1/2
3 1/2	6.67 1/2	60	3 1/2
7	8.66 1/2	57	7
9	10.65 1/2	56	9
11	12.64 1/2	55	11

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

In.	o.d.	13 B.W.G.	Cold Drawn	Hot Rolled
1	13 B.W.G.	\$ 8.60	\$ 7.82	
1 1/4	13 B.W.G.	10.19	9.26	
1 1/2	13 B.W.G.	11.26	10.23	
1 3/4	13 B.W.G.	12.31	11.64	
2	13 B.W.G.	14.35	13.04	
2 1/4	13 B.W.G.	16.00	14.54	
2 1/2	13 B.W.G.	17.61	16.01	
2 3/4	13 B.W.G.	19.29	17.54	
3	13 B.W.G.	20.45	18.59	

In.	o.d.	12 B.W.G.	\$21.45	\$19.50
3 1/2	12 B.W.G.	41.08	37.35	
4	12 B.W.G.	27.99	24.82	
4 1/2	12 B.W.G.	38.60	30.54	
5	12 B.W.G.	41.08	37.35	
5 1/2	9 B.W.G.	51.56	46.87	
6	7 B.W.G.	79.15	71.90	

Extra for less-carload quantities:

Quantity	Discount
25,000 lb. or ft. to 39,999 lb. or ft.	5 %
12,000 lb. or ft. to 24,999 lb. or ft.	12 1/2 %
6,000 lb. or ft. to 11,999 lb. or ft.	25 %
2,000 lb. or ft. to 5,999 lb. or ft.	35 %
Under 2,000 lb. or ft.	50 %

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago, \$48.40
6-in. and larger, del'd New York 45.20
*6-in. and larger, Birmingham 40.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles... 48.00
F.o.b. dock, Seattle40.50
F.o.b. dock, Seattle51.50
Class "A" and gas pipe, \$3 extra.
4-in. pipe is \$3 a ton above 6-in.

* Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$39. Birmingham, and \$47.40, delivered Chicago and 4-in. pipe, \$42. Birmingham, and \$50.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:
1/2 in. x 6 in. and smaller...70 and 10
Larger than 1/2 in.....70 and 5
Lag bolts70 and 5
Flow bolts, Nos. 1, 2, 3, and 7
heads70 and 5
Hot-pressed nuts, blank or tapped, square70 and 5
Hot-pressed nuts, blank or tapped, hexagon70 and 5
C.p.c. and t. square or hex. nuts, blank or tapped.....70 and 5
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes
60, 20 and 10
Stove bolts in packages, nuts attached75
Stove bolts in packages, with nuts separate75 and 5
Stove bolts in bulk.....82 1/2
Tire bolts50 and 5

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(1/2-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland...\$3.05
F.o.b. Chicago or Birmingham.. 3.15

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh70 and 5
F.o.b. Cleveland70 and 5
F.o.b. Chicago and Birm'g'm.70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller80, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller 75
Milled headless set screws, cut thread 3/4 in. and smaller..... 75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller60
Upset set screws, cup and oval points75
Milled studs65 to 65 and 10

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs
F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, \$51 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base..... 2.55c.
Delivered price at Detroit is.. 2.70c.

S.A.E. Alloy
Series Differential
Numbers per 100 lb.

2000 (1/2% Nickel)	\$0.25
2100 (2 1/4% Nickel)	0.95
2300 (3 1/2% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30) Molybdenum (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel...base	
6100 Chromium Vanadium Bar	1.10c.
6100 Chromium Vanadium Spring Steel	0.70
Chromium Nickel Vanadium	1.40
Carbon Vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars 1/2c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.05c. base per lb. Delivered Detroit, 3.20c.

STAINLESS STEEL No. 302

(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20 1/2 c.
Cold-rolled strip	27c.
Drawn wire	23c.

TOOL STEEL

Base per Lb.

High speed	57 1/2 c.
High carbon chrome	37c.
Oil hardening	21c.
Special	19c.
Extra	15 1/2 c.
Regular	12 1/2 c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports
Based on Exchange rate as of Oct. 6

Ferromanganese, export	\$45.58
Billets, open-hearth	29.74 to \$31.01
Tin plate, per base box	4.74 to 4.84
Steel bars, open-hearth	39.37
Beams, open-hearth	38.61
Channels, open-hearth	39.37
Angles, open-hearth	38.61
Black sheets, No. 24 gage	51.66
Galvanized sheets, No. 24 gage	61.50

CONTINENTAL

Per Metric Ton, f.o.b. Continental Ports
Based on Exchange rate of Oct. 6

Billets, Thomas	\$19.27
Wire rods, No. 5 B.W.G.	36.90
Steel bars, merchant	26.64
Sheet bars	19.68
Plate, 1/4 in. and up	35.42
Plate, 3/16 in. and 5 mm.	34.85
Sheets, 1/4 in.	36.90
Beams, Thomas	25.58
Angles (Basic)	25.58
Hoops and strip base	32.79
Wire, plain, No. 8	44.03
Wire nails	47.15
Wire, barbed, 4 pt. No. 10 B.W.G.	71.74

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.25c.
Structural shapes	3.25c.
Soft steel bars and small shapes	3.15c.
Reinforcing steel bars	3.15c.
Cold-finished and screw stock:	
Rounds and hexagons	3.60c.
Squares and flats	3.60c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	3.30c.
Hoops	3.80c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.45c.
Galv. sheets (No. 24), 25 or more bundles	4.05c.
Hot-rolled sheets (No. 10)	3.05c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$3.77
Spikes, large	3.25c.
Per Cent Off List	
Track bolts, all sizes, per 100 count	60
Machine bolts, 100 count	65-5
Carriage bolts, 100 count	65-5
Nuts, all styles, 100 count	65-5
Large rivets, base per 100 lb.	\$3.65
Wire, black, soft ann'l'd, base per 100 lb.	2.90c.
Wire, galv. soft, base per 100 lb.	3.25c.
Common wire nails, per keg	2.35c.
Cement coated nails, per keg	2.35c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, rounds	3.20c.
Soft steel bars, squares and hexagons	3.35c.
Cold-fin. steel bars:	
Rounds and hexagons	3.75c.
Flats and squares	3.75c.
Hot-rolled strip	3.40c.
Hot-rolled annealed sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.65c.
Spikes (keg lots)	3.85c.
Track bolts (keg lots)	4.85c.
Rivets, structural (keg lots)	3.80c.
Rivets, boiler (keg lots)	3.90c.
Per Cent Off List	
Machine bolts	*65
Carriage bolts	*65
Lag screws	*65
Hot-pressed nuts, sq. tap or blank	*65
Hot-pressed nuts, hex. tap or blank	*65
Hex. head cap screws	87½
Cut point set screws	75 and 10
Flat head bright wood screws	70
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	\$4.50 off list
Black ann'l'd wire per 100 lb.	\$3.95
Com. wire nails, 50 kegs or more	2.40c.†
Cement c't'd nails, 50 kegs or more	2.40c.†

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

†Prices for city and suburbs only.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.50c.
Structural shapes	3.47c.
Soft steel bars, rounds	3.51c.
Iron bars, Swed. char-coal	6.75c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.06c.
Flats and squares	4.06c.
Cold-rolled; strip, soft and quarter hard	3.36c.
Hoops	3.66c.

Bands	3.66c.
Hot-rolled sheets (No. 10)	3.15c. to 3.41c.
Hot-rolled ann'l'd sheets (No. 24*)	3.75c. to 4.10c.
Galvanized sheets (No. 24*)	4.10c. to 4.50c.
Long terme sheets (No. 24)	5.25c. to 5.35c.
Armco iron, galv. (No. 24†)	5.65c.
Toncan iron, galv. (No. 24†)	5.65c.
Galvanneal (No. 24†)	5.75c.
Armco iron, hot-rolled annealed (No. 24†)	5.10c.
Toncan iron, hot-rolled annealed (No. 24†)	5.10c.
Armco iron hot-rolled (No. 10†)	4.15c.
Toncan iron, hot-rolled (No. 10†)	4.15c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	4.65c.
Deep drawing	5.40c.
Stretcher leveled	5.40c.
SAE, 2300, hot-rolled	6.97c.
SAE, 3100, hot-rolled	5.37c.
SAE, 6100, hot-rolled, annealed	9.57c.
SAE, 2300, cold-rolled	8.03c.
SAE, 3100, cold-rolled, annealed	7.43c.
Floor plate ¼ in. and heavier	5.30c.
Standard tool steel	11.25c.
Wire, black annealed (No. 9)	3.50c.
Wire, galv. (No. 9)	3.85c.
Tire steel, 1 x ½ in. and larger	3.85c.
Open-hearth spring steel	4.00c. to 10.00c.
Common wire nails, base per keg	\$3.21

Per Cent Off List
Machine bolts, square head and nut:

All diameters	65 and 10
Carriage bolts, cut thread:	
All diameters	65 and 10

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.
†125 lb. and more.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.55c.
Bars, soft steel (rounds and flats)	3.45c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.60c.
Cold-fin. rounds, shafting, screw stock	4.00c.
Hot-rolled annealed sheets (No. 24)	4.30c.
Galv. sheets (No. 24)	4.90c.
Hot-rolled sheets (No. 10)	3.40c.
Black corrug. sheets (No. 24)	4.30c.
*Galv. corrug. sheets	4.90c.
Structural rivets	4.15c.
Boiler rivets	4.25c.

Per Cent Off List
Tank rivets, 7/16 in. and smaller, 55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities 65

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼ in. and heavier	3.10c.
*Structural shapes	3.10c.
*Soft steel bars, small shapes, iron bars (except bands)	3.15c.
†Reinforc. steel bars, sq. twisted and deformed	2.96c.
Cold-finished steel bars	3.91c.
*Steel hoops	3.55c.
*Steel bands, No. 12 and 3/16 in. incl.	3.30c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	3.75c.
†Galvanized sheets (No. 24)	4.50c.
*Hot-rolled annealed sheets (No. 10)	3.20c.
Diam. pat. floor plates, ¼ in.	5.05c.
Swedish iron bars	6.25c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

†For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.41c.
Soft steel bars	3.10c.
†Reinforc. steel bars	2.10c.
†Cold-finished steel bars	3.75c.
Flat-rolled steel under ¼ in.	3.46c.
Cold-finished strip	†3.00c.
Hot-rolled annealed sheets (No. 24)	3.91c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.21c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.46c.
*Black ann'l'd wire, per 100 lb.	\$2.80
*No. 9 galv. wire, per 100 lb.	3.15
*Com. wire nails, base per keg	2.25

†Outside delivery 10c. less.

*For 5000 lb. or less.

†Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.52c.
Floor plates	5.27c.
Bars, rounds, flats and angles	3.42c.
Other shapes	3.57c.
Rail steel reforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.57c.
Cold-finished bars	3.97c.
Hot-rolled annealed sheets (No. 24) 25 bundles or more	3.72c.
Galv. sheets (No. 24) 3750 lb. or more	4.07c.
Galvanized sheets (No. 24) over 3500 lb.	4.07c.
Hot-rolled sheets (No. 10)	3.32c.
Structural rivets	4.50c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	\$2.88
Com. wire nails, base per keg	
Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb. keg	3.50
Chain. lin. per 100 lb.	8.35

Net per 100 Ft.

Seamless steel boiler tubes,	
2-in.	\$20.37
4-in.	48.14
Lap-welded steel boiler tubes,	
2-in.	19.38
4-in.	45.32

BUFFALO

	Base per Lb.
Plates	3.48c.
Struc. shapes	3.35c.
Soft steel bars	3.15c.
Reinforcing bars	2.60c.
Cold-fin. flats and sq.	3.70c.
Rounds and hex.	3.70c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.16c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.53c.
Galv. sheet (No. 24)	4.80c.
Bands	3.53c.
Hoops	3.53c.
Heavy top-rolled sheets	3.28c.
Com. wire nails, base per keg	\$2.85
Black wire, base per 100 lb. (2500-lb. lots or under)	4.00
(Over 2500 lb.)	3.90

BOSTON

	Base per Lb.
Beams, channels, angles	3.65c.
Tees and zeos, under 3"	3.90c.
H beams and shapes	3.64c.
Plates—Sheared, tank, and univ. mill, ¼ in. thick and heavier	3.66c.
Floor plates, diamond pattern	5.46c.
Bar and bar shapes (mild steel)	3.65c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.75c. to 4.75c.
Half rounds, half ovals, ovals and bevels	4.90c.
Tire steel	4.90c.
Cold-rolled strip steel	3.10c.
Cold-finished rounds, squares and hexagons	4.10c.
Cold-finished flats	4.10c.
Blue annealed sheets, No. 10 ga.	3.75c.
One pass cold-rolled sheets No. 24 ga.	4.30c.
Galvanized steel sheets, No. 24 ga.	4.30c.
Lead coated sheets, No. 24 ga.	5.85c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

Base per Lb.

Soft steel bars	3.29c.
Structural shapes	3.52c.
Plates	3.52c.
Floor plates	5.27c.
Hot-rolled annealed sheets (No. 24)*	4.14c.
Hot-rolled sheets (No. 10)** ..	3.24c.
Galvanized sheets (No. 24)....	4.82c.
Bands	3.49c.
Hoops	3.49c.
†Cold-finished bars	3.84c.
Cold-rolled strip	3.18c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.44c.
Bolts and nuts, in cases, 70 and 10 per cent off list	
Broken cases...65 and 10 per cent off	

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

* Base less 0.25c., 3500 lb. and over. Add 0.50c. per hundred lb. for broken bundles.

** Base less 0.25c., 1500 to 3749 lbs.; less 0.50c., 3750 to 7499 lb.; less 0.75c., 7500 lb. and over.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

Country territory to be equalized on the Chicago plan.

BALTIMORE

Base per Lb.

Mild Steel bars and small shapes	3.10c.
Structural shapes	3.10c.
Reinforcing bars .....	....prices on application
Plates	3.10c.
Hot-rolled sheets, No. 10.....	3.20c.
Bands	3.30c.
Hoops	3.55c.
Special threading steel.....	3.20c.
Diamond pattern floor plates ¼ in. and heavier	5.10c.
Galvanized bars and small shapes	5.60c.
Galvanized bands	5.80c.
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	3.88c.

All prices are for 2000 lb. and more. For second zone add 10c. per 100 lb. for trucking.

List size extras of Aug. 15, 1935, and cutting extras to be added.

For cold-rolled products, list size extras from Jan. 1, 1936, and cutting extras to be added.

PACIFIC COAST

Base per Lb.

San Francisco	Los Angeles	Seattle
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Plates, tank and U. M.	3.60c.	3.80c.	3.75c.
Shapes, standard	3.60c.	3.80c.	3.75c.
Soft steel bars..	3.60c.	3.80c.	3.75c.
Reinforcing bars, f.o.b. cars dock			
Pacific ports..	2.45c.	2.45c.	2.45c.
Hot-rolled annealed sheets (No. 24)	4.30c.	4.35c.	4.30c.
Hot-rolled sheets (No. 10)	3.70c.	3.90c.	3.85c.
Galv. sheets (No. 24 and lighter)	5.00c.	4.60c.	4.60c.
Galv. sheets (No. 22 and heavier)	5.00c.	4.80c.	5.10c.
Cold finished steel			
Rounds	6.05c.	6.10c.	6.00c.
Squares and hexagons ..	7.30c.	7.35c.	7.25c.
Flats	7.80c.	7.85c.	8.25c.

Common wire nails—base per keg less carload	\$2.90	\$2.90	\$2.90
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All items subject to differentials for quantity.

MILWAUKEE

Base per Lb.

Plates and structural shapes..	3.41c.
Soft steel bars, rounds up to 8 in., flats and fillet angles....	3.31c.
Soft steel bars, squares and hexagons	3.46c.
Hot-rolled strip	3.51c.
Hot-rolled sheets (No. 10)....	3.26c.
Hot-rolled annealed sheets (No. 24)	4.16c.
Galvanized sheets (No. 20) ..	4.76c.
Cold-finished steel bars.....	3.76c.
Cold-rolled strip	3.33c.
Structural rivets (keg lots)....	4.01c.
Boiler rivets, cone head (keg lots)	4.11c.
Track spikes (keg lots)	4.06c.
Track bolts (keg lots)	5.06c.
Black annealed wire	3.40c.
Com. wire nails	2.60c.
Cement coated nails	2.60c.

Per Cent Off List

Machine bolts, carriage bolts and lag screws	70 to 75
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)....	70

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

Base per Lb.

Mild steel bars, rounds	3.45c.
Structural shapes	3.55c.
Plates	3.55c.
Cold-finished bars	4.00c.
Bands and hoops	3.65c.
Hot-rolled annealed sheets, No. 24	4.30c.
Galvanized sheets, No. 24.....	4.90c.

On mild steel bars, shapes, plates and hoops and bands the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

CHATTANOOGA

Base per Lb.

Mild steel bars	3.46c.
Iron bars	3.46c.
Reinforcing bars	3.46c.
Structural shapes	3.66c.
Plates	3.66c.
Hot-rolled sheets No. 10.....	3.46c.
Hot-rolled annealed sheets No. 24*	3.41c.
Galvanized sheets, No. 24*....	3.96c.
Steel bands	3.71c.
Cold-finished bars	4.281c.

* Plus mill item extra.

MEMPHIS

Base per Lb.

Mild steel bars	3.57c.
Shapes, bar size	3.57c.
Iron bars	3.57c.
Structural shapes	3.77c.
Plates	3.77c.
Hot-rolled sheets, No. 10.....	3.57c.
Hot-rolled annealed sheets, No. 24	4.37c.
Galvanized sheets, No. 24....	5.07c.
Steel bands	3.82c.
Cold-drawn rounds	4.04c.
Cold-drawn flats, squares, hexagons	6.04c.
Structural rivets	4.25c.
Bolts and nuts, per cent off list	65
Small rivets, per cent off list.	50

NEW ORLEANS

Base per Lb.

Mild steel bars	3.45c.
Reinforcing bars	3.50c.
Structural shapes	3.65c.
Plates	3.65c.
Hot-rolled sheets, No. 10.....	3.65c.
Hot-rolled annealed sheets, No. 24	4.35c.
Galvanized sheets, No. 24....	4.95c.
Steel bands	4.05c.
Cold-finished steel bars	4.55c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	\$2.45
Bolts and nuts, per cent off list	70

REFRACTORIES PRICES

Fire Clay Brick

Per 1000 f.o.b Works

High-heat duty, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	\$45.00
High-heat duty, New Jersey....	50.00
High-heat duty, Ohio	40.00
Intermediate, Pennsylvania, Maryland, Kentucky, Mis- souri and Illinois	40.00
Intermediate, New Jersey	43.00
Intermediate, Ohio	35.00
Ground fire clay, per ton	7.00

Silica Brick

Per 1000 f.o.b Works

Pennsylvania	\$45.00
Chicago District	54.00
Birmingham	\$48 to 50.00
Silica cement per net ton	8.00

Chrome Brick

Per Net Ton

Standard f.o.b. Baltimore, Plym- outh Meeting and Chester....	\$45.00
Chemically bonded f.o.b. Balti- more, Plymouth Meeting and Chester, Pa.	45.00

Magnesite Brick

Per Net Ton

Standard f.o.b. Baltimore and Chester, Pa.	\$65.00
Chemically bonded, f.o.b. Balti- more	55.00

Grain Magnesite

Per Net Ton

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks).....	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.; Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	\$20.50
Delivered Brooklyn	22.9289
Delivered Newark or Jersey City	21.9873
Delivered Philadelphia	21.3132
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	19.50
F.o.b. Jackson, Ohio	21.25
Delivered Cincinnati	19.82
F.o.b. Duluth	20.00
F.o.b. Provo, Utah	17.50
Delivered San Francisco, Los Angeles or Seattle	22.315
F.o.b. Birmingham*	15.88

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of .70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.; Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	\$20.00
Delivered Boston Switching District	20.50
Delivered Newark or Jersey City	21.4873
Delivered Philadelphia	20.8132
F.o.b. Buffalo	18.50
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	19.00
Delivered Cincinnati	18.82
Delivered Canton, Ohio	20.3482
Delivered Mansfield, Ohio	20.8332
F.o.b. Jackson, Ohio	20.75
F.o.b. Provo, Utah	17.00
F.o.b. Birmingham	14.50

Bessemer

F.o.b. Everett, Mass.; Bethlehem, Birdsboro and Swedeland, Pa.	\$21.50
Delivered Boston Switching District	22.00
Delivered Newark or Jersey City	22.9873
Delivered Philadelphia	22.3132
F.o.b. Buffalo and Erie, Pa., and Duluth	20.50
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	20.00
F.o.b. Birmingham	21.00
Delivered Cincinnati	21.0807
Delivered Canton, Ohio	21.3482
Delivered Mansfield, Ohio	21.8832

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$24.00
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Gray Forge

Valley or Pittsburgh furnace	\$19.00
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Charcoal

Lake Superior furnace	\$22.50
Delivered Chicago	25.7528

Canadian Pig Iron

Per Gross Ton

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	22.50
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Domestic, 80% (carload)	\$75.00

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$26.00
50-ton lots 3-mo. shipment	24.00
F.o.b. New Orleans	26.00

Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton	
F.o.b. Jackson, Ohio, 6.00 to 6.50%	\$22.75
For each additional 0.5% silicon up to 17%, 50c. a ton is added.	

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton	
10.00 to 10.50%	\$27.75
10.51 to 11.00%	28.25
11.01 to 11.50%	28.75
11.51 to 12.00%	29.25
12.01 to 12.50%	29.75
12.51 to 13.00%	30.25
13.01 to 13.50%	30.75
13.51 to 14.00%	31.25
14.01 to 14.50%	31.75
14.51 to 15.00%	32.25
15.01 to 15.50%	32.75
15.51 to 16.00%	33.25
16.01 to 16.50%	33.75
16.51 to 17.00%	34.25

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained V del., carloads	\$1.30
Ferrotungsten, lots of 5000 lb.	1.35
Ferrotungsten, smaller lots	1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	\$2.50
Ferrocobaltititanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$137.50
Ferrocobaltititanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace carload and contract, per net ton	142.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	\$38.00
Ton lots or less, per ton	43.00
Silico-manganese, gross ton, delivered.	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00

Note: Spot prices are \$5 a ton higher except on 75 per cent ferrosilicon on which premium is \$10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton	
Old range, Bessemer, 51.50%	\$4.80
Old range, non-Bessemer, 51.50%	4.65
Mesabi, Bessemer, 51.50%	4.65
Mesabi, non-Bessemer, 51.50%	4.50
High phosphorus, 51.50%	4.40

Foreign Ore

C.A.F. Philadelphia or Baltimore

Per Unit	
Iron, low phos., copper free, 55 to 58% dry Algeria	12.50c.
Iron, low phos., Swedish, average, 68½% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	9.50c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	27c.
Man., African, Indian, 44-48%	25c.
Man., African, Indian, 49-51%	26c.
Man., Brazilian, 46 to 48½%	Nominal

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	\$15.25 to \$15.50
Tungsten, domestic, scheelite delivered, nominal	15.00

Per Gross Ton

Chrome, 45% Cr ₂ O ₃ , lamp, c.i.f. Atlantic Seaboard (African)	\$17.50
45 to 46% Cr ₂ O ₃ (Turkish)	\$16.50 to 17.00
48% Cr ₂ O ₃ (African)	20.50
48% min. Cr ₂ O ₃ (Turkish)	19.25
Chrome concentrate, 50% and over Cr ₂ O ₃ , c.i.f. Atlantic ports	22.00
52% Cr ₂ O ₃ (Turkish)	21.75
48 to 49% Cr ₂ O ₃ (Turkish)	19.25

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$18.00
Domestic, barge and rail	18.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	19.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	22.00
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	3.75c.
Del'd Ch'go, No. 3 industrial	5.00c.
Del'd Ch'go, No. 5 industrial	3.77c.
Del'd Cleve'd, No. 3 distillate	5.75c.
Del'd Cleve'd, No. 4 industrial	5.50c.
Del'd Cleve'd, No. 5 industrial	5.00c.

COKE AND COAL

Coke

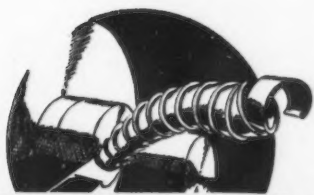
Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	\$3.75 to \$4.00
Foundry, f.o.b. Connellsville, Prompt	4.25 to 5.75
Foundry, by-product, Chicago ovens	9.00
Foundry, by-product, del'd New England	11.50
Foundry, by-product, del'd Newark or Jersey City	9.60 to 10.05
Foundry, by-product, Philadelphia	9.38
Foundry, by-product, delivered Cleveland	9.75
Foundry, by-product, delivered Cincinnati	9.50
Foundry, Birmingham	6.50
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¼-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45



THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

... Some gains are reported in orders.

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... Automotive plans enliven Detroit circles.

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... Present activity indicates little if any recession
in October-November sales.

o o o

By L. M. WAITE

o o o

WHILE there are reports in some quarters that formal order placing is under restraint until after the first of the year, other activity gives force to expectations that October and November will develop little if any recession from machine tool sale averages of the past few months.

Makers of types of machines which have been selling most heavily report some gain on machine sizes which have had the popular call. One or two makers of machines for single-class work appear to have gained substantially on delivery conditions in so far as standard machines are concerned.

Detroit

REPORTED plans of Chrysler to machine a great many of its parts, including the motor block, in its Canadian plant, have attracted a lot of machinery people across the river to Walkerville. A tool program of this kind, if undertaken, would represent a large investment in machine tools and may turn out to be the bright spot in the machinery picture this month and next.

General lines are moving fairly well. The organization of two companies in the precision parts and machinery field has created a new outlet for both new and used equipment.

The Toledo Machine & Tool Co. plant and other units of the E. W. Bliss Co. in Toledo are reported to have a heavy bank of unfilled orders.

Upper New York State

FOLLOWING a slight recession in machine tool buying, which carried through the early part of September,

there has been a pronounced up-state sales pick-up, particularly among larger buyers. Screw machines have accounted for several single-machine orders, one order for four machines and another for 10. Marked interest in and some buying of radials and boring mills are reported. Two new inquiries are out for planers. High-production drilling machine orders have included four semi-special units for multiple work and two units for single work. Some 60 motor-driven polishing lathes were recently purchased as an item in a replacement buying program. Small machinery makers are receiving every attention, particularly if and when their capacity is sufficient to insure prompt deliveries. Dealers look for a continuation of this buying movement.

Pittsburgh

INQUIRIES are up sharply over the last two weeks. While a majority of requests are for data on individual machines, a fair number of lists are coming out. Orders have taken a spurt and a good October is anticipated. Contracts involving a number of presses for Westinghouse Electric & Mfg. Co. have been closed within the past week. Steel scrap activity is responsible for several orders for shears.

Chicago

SALES are moderately improved and the indications are that this trend will continue as the fall season advances. Several dealers report that sales in quiet areas are beginning to show life and that distribution is fairly even now throughout the Chicago area. An interesting point is that deliveries are improving. This is not due to a heavy drop in business, but rather it is attributed to the fact that machine

tool builders are slowly but surely swinging into smoother and better plant operation.

It is expected that buying against current lists will be spread out over several months. Some machine tools are now being sold for Jan. 2 billing.

Cincinnati

SEPTEMBER machine tool demand and inquiry which began slowly, now indicate September sales in excess of August. Spectacular buying is still absent, but the flow of single unit orders has increased. Boring mills are leading in heavy tool demand, while light tools still maintain volume lead.

Cleveland

MACHINE tool sales by manufacturers continue very good. Orders are almost entirely for single machines from widely diversified industries. Very little business is coming at present from the automotive field. Automatic screw machines are very active and deliveries are extended to three months on some types and sizes. Business with local dealers continues light. The Cleveland Waterworks Department has taken bids for three lathes and a milling machine.



.. TRADE NOTES ..

Ajax Electric Co., Philadelphia, and Continental Engineers, Inc., Chicago, have reached a working agreement whereby their products will be jointly marketed. The Ajax company manufactures the Ajax-Hultgren furnace, which may be used for liquid heat treating, case hardening or other metal heating operations, and Continental Engineers, Inc., has developed a system which mechanically moves materials being heat treated through a predetermined cycle.

Gould Coupler Corp., Rochester, N. Y., has been formed, succeeding and acquiring entire business of Gould Coupler Co., subject to outstanding obligations and commitments of the receivers and trustees of that company.

Oilgear Co., Milwaukee, has licensed Weatherly Oilgear Co., Ltd., London, to assemble and distribute its line of hydraulic broaching machines and presses for European trade. Milwaukee works will supply primary equipment.

New York Belting & Packing Co., has appointed Laib Co., Inc., 754 South First Street, Louisville, as distributors in the Louisville territory.

Leeds & Northrup Co., 4901 Stenton Avenue, Philadelphia, has opened a sales and service office at 422 Chamber of Commerce Building, 80 Federal Street, Boston. A complete line of its electric heat-treating furnaces, measuring, recording and controlling instruments will be handled.



PLANT EXPANSION AND EQUIPMENT BUYING

... International Harvester Co., Chicago, plans an expenditure of \$750,000 for new factory branch at Indianapolis.

• • •

... Owens-Illinois Can Co., Baltimore, has asked bids on two additions costing about \$275,000 with equipment.

◀ NORTH ATLANTIC ▶

Continental Can Co., 100 East Fortieth Street, New York, has let general contract to Austin Co., 19 Rector Street, for new three-story plant, 140 x 160 ft., at Malden, Mass. Cost over \$100,000 with equipment. Company has also awarded contract to George J. Glover Co., Inc., Whitney Bank Building, New Orleans, for one-story addition, 120 x 260 ft., to branch plant at Harvey, La., primarily for storage and distribution. Cost close to \$100,000 with equipment. Favrot & Reed, Nola Building, New Orleans, are architects for last noted structure.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Oct. 13 for 6000 non-tight water attachment plugs (Schedule 8886), 16 boiler water gages, spare parts and tools (Schedule 8921); until Oct. 20, electric cable (Schedule 8959) for Brooklyn Navy Yard; until Oct. 13, six motor-driven centrifugal pumps and spare parts (Schedule 8920), 330 corrosion-resisting steel reinforcing segments (Schedule 8911) for Brooklyn and Philadelphia yards; 5575 ft. bronze steam hose (Schedule 8871) for Brooklyn and Mare Island yards; until Oct. 23, 22 electric arc welding sets (Schedule 8989) for Brooklyn and Puget Sound yards.

Petrol Refining Co., 205 East Forty-second Street, New York, has acquired about 40 acres at Corpus Christi, Tex., for new oil refinery, for production of fuel and furnace oils, with division for gasoline manufacture, and steel tank storage and distributing units. Plant will include power house, pumping station, machine shop and other mechanical departments. Cost close to \$1,000,000 with equipment. Work is scheduled to begin this fall.

Schlachter Brothers, Long Island City, have leased one-story building at 38-06 Twenty-fourth Street for new foundry for production of iron castings.

Constructing Quartermaster, United States Military Academy, West Point, N. Y., plans two steel hangars for student airplanes, with reconditioning and repair facilities at new Federal airport at Newburgh, N. Y., where 140-acre tract has been secured. Fund of \$400,000 has been authorized for initial building and field, to be increased later for additional buildings and facilities.

C. Lehmann Packing Co., 321 Johnson Avenue, Brooklyn, meat packer, has begun expansion and improvements in plant and will install additional equipment for increased capacity. Cost about \$100,000 with machinery. Company is operated by Adolf Gobel, Inc., 26 Rock Street, Brooklyn.

Last noted company has plans for two-story addition to plant at latter address, including improvements in present unit. Cost about \$75,000 with equipment. Hedman-Stein Engineering Corp., 125 Baxter Street, New York, is engineer for last noted work.

Quartermaster Supply Office, Brooklyn, asks bids until Oct. 14 for galvanized wire, nails, wire staples, steel strapping and other supplies (Proposal 626-58).

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until Oct. 15 for 5010 parachute assemblies (Circular 125); until Oct. 19, one open-type deaerating feedwater heater (Circular 126).

Condenser Service & Engineering Co., 310 Twelfth Street, Hoboken, N. J., manufacturer of radio condensers, parts and allied equipment, has leased 36,000 sq. ft. floor space in Waverly Terminal Building, Elizabeth, and will remove present works to new location and increase capacity.

Commissioner of Institutions and Agencies, State Office Building, Trenton, N. J., asks bids until Oct. 16 for feedwater heater and auxiliary equipment for institution at New Lisbon, N. J.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Oct. 20 for screw stock and special strip spring steel (Circular 151); until Oct. 21, extruded half-hard commercial brass shapes for mechanical time fuzes and 38,000 lb. half-hard commercial brass rods for similar fuzes (Circular 153); until Oct. 26, 74,155 shell body forgings (Circulars 138, 939, 140), 10,900 shell body forgings, with alternate bids for 240,000 lb. steel and iron turnings into such number (10,900) shell body forgings (Circular 134), reworking 5850 lb. copper turnings into 810 lb. hard seamless copper tubing for rotating bands (Circular 143).

Wilkening Mfg. Co., 2000 South Seventy-first street, Philadelphia, manufacturer of piston rings and kindred mechanical products, has let general contract to William F. Lotz, 4700 Frankford Avenue, for one and two-story foundry addition, 100 x 150 ft. Cost over \$75,000 with equipment. Silverman & Levy, 313 South Smedley Street, are architects.

◀ NEW ENGLAND ▶

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Oct. 14 for two sets half-side milling cutters (Circular 57); until Oct. 20, two selective geared head lathes (Circular 50).

United States Rubber Co., Malden, Mass., plans one-story plant at Chelsea, Mass. Cost over \$50,000 with equipment. Main offices are at Broadway and Fifty-eighth Street, New York.

Colonial Beacon Oil Co., 378 Stuart Street, Boston, plans rebuilding part of oil refinery at Everett, Mass., recently destroyed by fire. Loss close to \$100,000 with equipment.

Smith Paper, Inc., Lee, Mass., manufacturer of kraft, tissue and other paper stocks, has asked bids on general contract for two one-story and basement additions, 140 x 160 ft., and 125 x 130 ft., first unit a machine division for paper manufacture and other for finishing operations. Cost over \$125,000 with machinery.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Oct. 16 for 200,000 lb. of bronze ingots for remelting (Schedule 8985).

Edison Electric Illuminating Co., 182 Tremont Street, Boston, has leased tract of about 900,000 sq. ft. near junction of Mystic Valley, Middlesex Fells and Revere Beach Parkways, Medford, Mass., for new radio broadcasting plant for its Station WEEI. Installation will include two steel towers, antenna, generating station and other units.

Water Department, Abington, Mass., will take bids soon for new steel standpipe at North Abington. Whitman & Howard, 89 Broad Street, Boston, are consulting engineers.

◀ BUFFALO DISTRICT ▶

Elmira Foundry Co., Elmira, N. Y., manufacturer of heavy and light iron castings, etc., has let general contract to H. W. Streeter Corp., Elmira, for one-story addition. Cost close to \$100,000 with equipment. Company is a subsidiary of General Electric Co.

Public Works Department, City Hall, Buffalo, has secured appropriation of \$345,000 for new equipment for street-cleaning and maintenance, snow-handling and removal, refuse and garbage disposal, etc., including motorized machinery. Of amount noted, about \$247,000 will be used for equipment for streets division.

Upson Co., Upson Point, Lockport, N. Y., manufacturer of pressed pulpwood products, wallboard and kindred specialties, plans steam power house. One-story mill addition also will be built, primarily for storage and distribution. Cost close to \$50,000 with equipment.

◀ OHIO AND INDIANA ▶

Dayton Rubber Mfg. Co., 2380 West River-view Avenue, Dayton, Ohio, manufacturer of automobile tires, belting, mechanical rubber goods, etc., will take bids soon on general contract for one-story addition, about 50,000 sq. ft. floor space, primarily for storage and distribution. Cost over \$80,000 with equipment. Geyer & Neuffer, Ludlow Arcade Building, are architects.

Progress Vacuum Cleaner Corp., East Fortieth Street and Kelley Avenue, N.E., Cleveland, has leased additional space at same location, about 5000 sq. ft. floor area, and will occupy for expansion.

Vess Beverage Bottling Co., 9 Brewer Street, Columbus, Ohio, has asked bids on general contract for two-story mechanical-bottling, storage and distributing plant, 82 x 85 ft., with extension, 24 x 25 ft. Cost close to \$40,000 with equipment. Frederick Fornoff, 35 East Main Street, is architect.

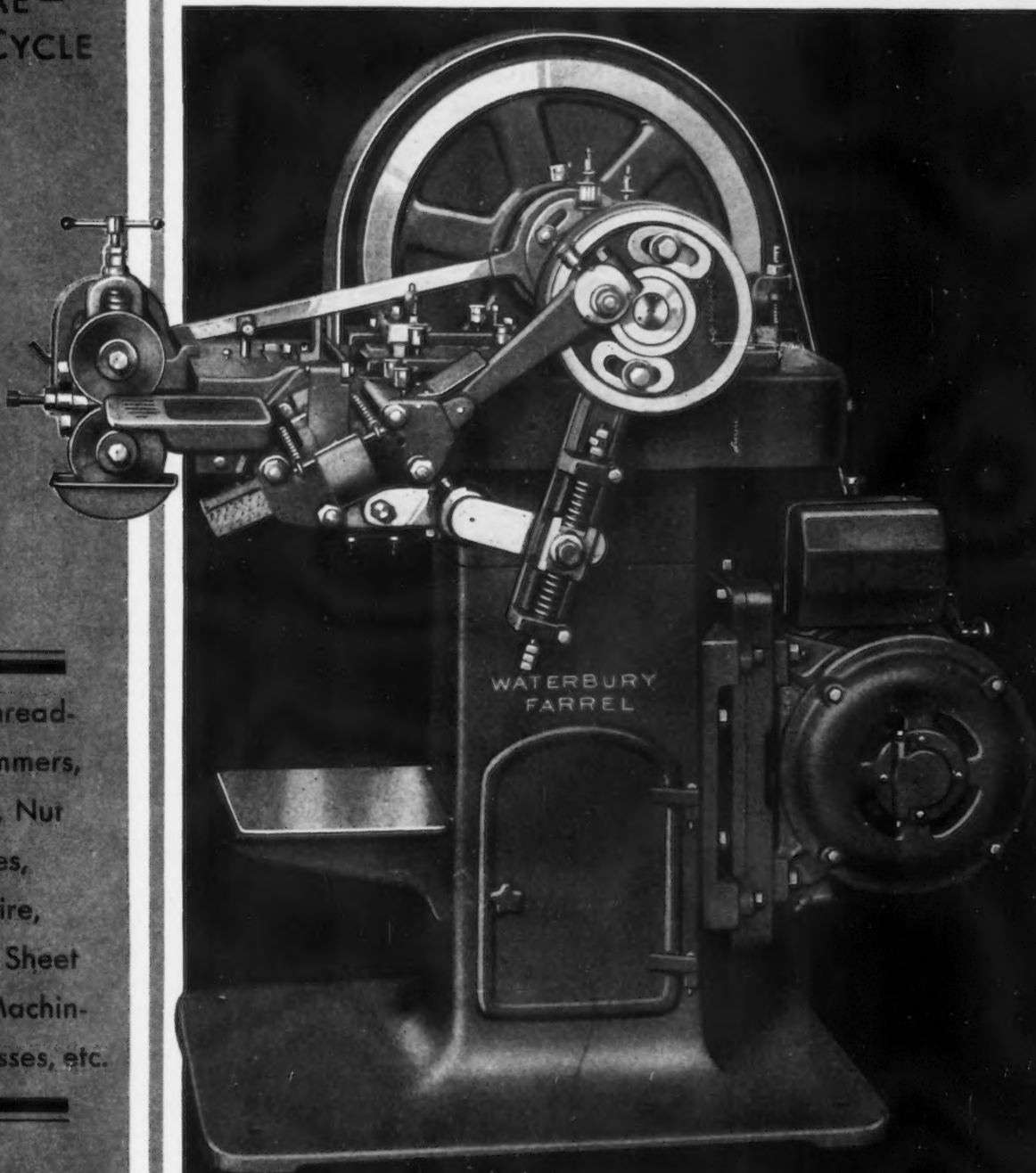
Zanesville Mould Co., Muskingum Avenue, Zanesville, Ohio, manufacturer of mechanical patterns, molds, etc., has begun superstructure for one-story addition, 75 x 100 ft., for which general contract recently was let to W. J. Heck Construction Co., Zanesville, for expansion in engineering and pattern divisions. Cost over \$30,000 with equipment.

Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Oct. 12 for 40 wheel assemblies and 40 brake assemblies (Circular 224), gun mount bearing retainer pins, gun mount cam link adjusting screws, rewind-drive worm gear assembly, flare back door assembly and clevis for control cable (Circular 203), 10 ballast-type valve assembly.

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blies (Circular 211); until Oct. 15, panel brackets, condensers, copper wire, switches, rubber-covered wire, tinned copper wire, transformers, screws, flexible wire, etc. (Circular ARL 5); until Oct. 16, starter assemblies (Circular 197).

Sunbeam Electric Mfg. Co., Evansville, Ind., manufacturer of automobile headlights, etc., has let general contract to Tri-State Construction Co., 1525 Shanklin Avenue, for one and two-story addition, 135 x 180 ft. Cost close to \$100,000 with equipment. E. C. Berendes, 121 N.W. Fourth Street, is architect.

Industrial Plants Corp., Toledo, will sell at public auction, Oct. 15, entire machinery and modern tool room equipment of Trundle Engineering Co., 118 St. Clair Street East, Cleveland.

◀ MICHIGAN DISTRICT ▶

Leonard Refrigerator Co., Grand Rapids, Mich., manufacturer of electric refrigerators, cabinets, etc., has let general contract to Barnes Brothers Construction Co., Grand Rapids, for one-story addition, improvements in present plant. Cost over \$60,000 with equipment. Company is a subsidiary of Kelvinator Corp., 14250 Plymouth Street, Detroit.

United States Engineer Office, Federal Building, Detroit, asks bids until Oct. 14 for 24,000 $\frac{3}{4}$ -in. diameter expansion hook bolts (Circular 18).

Simplicity Pattern Co., Durand, Mich., manufacturer of multiple screens for sand, gravel and other service, and kindred metal specialties, has let general contract to Burbank Construction Co., Flint, Mich., for one-story addition, 50 x 100 ft. Cost about \$35,000 with equipment.

United Steel & Wire Co., Fonda Avenue, Battle Creek, Mich., manufacturer of wire goods, steel shelving and kindred products, has let general contract to F. J. Skidmore & Sons, Battle Creek, for two one-story additions, one for galvanizing and tinning divisions, and other for general operating service and inspection. Company will also make extensions and improvements in storage and distributing facilities. Cost about \$150,000 with equipment. George J. Genebach is president.

Quartermaster, CCC, Fort Brady, Mich., asks bids until Oct. 18 for 3000-gal. tank and tower (Proposal 4601-18).

Muskegon Piston Ring Co., Muskegon, Mich., has let general contract to P. J. Ramberg, Muskegon, for one-story addition. Cost over \$45,000 with equipment.

Farmers' Grain Elevator Co., Chesaning, Mich., has plans for three-story grain elevator. Cost about \$50,000 with elevating, conveying, screening and other equipment.

◀ MIDDLE WEST ▶

International Harvester Co., 606 South Michigan Avenue, Chicago, has acquired about $2\frac{1}{2}$ -acre tract on West Washington Street, Indianapolis, for new factory branch, service plant, storage and distributing building for motor truck and farm machinery divisions. It will be one-story, 260 x 664 ft., about 175,000 sq. ft. floor space; part of unit will be two stories, for office department on second floor. Cost ver \$750,000 with equipment. Present Indianapolis branch plant is at 319 South Missouri Street, and this will be removed to new location as soon as structure is ready.

Henson Beverage Co., 1223 South Homan Avenue, Chicago, has plans for one-story addition, 50 x 175 ft., for general production, storage and distribution. Cost about \$30,000 with equipment. David S. Klaffer, Inc., 100 North LaSalle Street, is architect.

Griesedieck Western Brewery Co., Belleville, Ill., has approved plans for additions for expansion in brew-house, mechanical-bottling, storage and distribution, and other operating divisions. Cost close to \$190,000 including equipment. Company is affiliated with Griesedieck Brothers Brewery Co., St. Louis.

Des Moines Railway Co., 114 South Eleventh Street, Des Moines, Iowa, asks bids until Nov. 2 for equipment for electric power plant, including watertube steam boiler unit with superheater and complete accessories (Section 1), forced-draft equipment, stoker and auxiliaries (Section 2), turbo-generator unit with accessories (Section 3), forced-draft and induced draft fans,

with ducts, dampers, etc. (Section 4), air preheaters (Section 5), direct-contact de-aerating heater, evaporator and allied equipment (Section 6), motor-driven feed pump and one dual-drive electric and steam-driven pump for boiler feed, with control equipment (Section 7), valves, fittings, power piping, etc. (Section 8), boiler metering equipment, temperature and outlet gas recorders and other instruments (Section 9). Federal Engineering Co., Central Office Building, Davenport, Iowa, is consulting engineer.

Royal Blue Stores, Inc., 2542 Ogden Avenue, Chicago, food products, has let general contract to Poirot Construction Co., 2001 West Pershing Road, for three-story addition to bulk storage and distributing plant, 120 x 145 ft. Cost over \$100,000 with mechanical-handling, loading and other mechanical equipment. A. Epstein, 2001 West Pershing Road, is architect and engineer.

Cutler-Hammer, Inc., Milwaukee, manufacturer of electric control apparatus, has placed in regular production a newly established branch factory at 970 Folsom Street, San Francisco, to supply Pacific Coast trade. R. R. Crooke is plant manager.

Automatic Products Co., 121 North Broadway, Milwaukee, manufacturer of automatic controls for oil burners, mechanical refrigerators, etc., has purchased enameling plant unit of former Fuller-Warren Co., at 2506 North Thirty-second Street, Milwaukee, containing 60,000 sq. ft. of floor space, with four acres of site. Work will begin at once on reconditioning shop at cost of \$15,000 and installation of considerable new machinery. Transfer of production from present plant will be made about Nov. 15. Roy W. Johnson is president, treasurer and chief engineer.

Cleaver-Brooks Co., 135 West Wells Street, Milwaukee, is increasing its capitalization for enlarging production of high-pressure boilers, tank car heaters, etc., which is carried on in plant of Milwaukee Reliance Boiler Works, 2784 North Thirty-second Street.

Furblo Co., Hermansville, Mich., manufacturer of blowers and other air-conditioning equipment, will equip new plant in new or leased quarters, following destruction of plant and machinery by fire on Sept. 25.

Directors of Western Malleables, Inc., Beaver Dam, Wis., on Sept. 29, announced permanent closing of plant and liquidation of business. Plant, which now occupies seven city squares, was established in 1892 as Beaver Dam Malleable Iron Co. and specialized originally in manufacture of railroad supplies. It was reorganized in 1928 under present name with local capital exclusively, and became one of chief supply units for Chevrolet and Buick divisions of General Motors Corp. In recent years, however, much of this business was transferred to foundries nearer automobile factories.

◀ WASHINGTON DIST. ▶

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Oct. 26 for parts for fire trucks, including axles, brake equipment, gear-steering equipment, springs, steel wheels, hand brakes, tubing, pipe and pipe fittings, wrenches, pliers and other tools and equipment, in all 352 items (Circular 398-21).

Owens-Illinois Can Co., Boston and Linwood Avenues, Baltimore, has asked bids on general contract for three-story addition, 180 x 260 ft. Cost close to \$275,000 with equipment. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects and engineers. Company is a subsidiary of Owens-Illinois Glass Co., Toledo.

General Purchasing Officer, Panama Canal, Washington, asks bids until Oct. 13 for 38,000 ft. wire rope, 100,000 ft. rubber-insulated wire, 20,000 ft. weatherproof wire, 8000 ft. copper cable, 30,000 ft. power and lighting type copper cable, 2000 ft. stranded copper cable, 15,000 lb. soft steel wire, three motor-generator sets, three electric ovens, switches, switchboard fittings and other equipment (Schedule 3184); until Oct. 14, two motor-driven pumping units with accessories, and two telescopic pipes (Schedule 3187).

General Refractories Co., Brooklyn, Baltimore, has plans for one-story addition, 80 x 200 ft. Cost over \$50,000 with equipment. Company headquarters are in Real Estate Trust Building, Philadelphia.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Oct. 13 for one motor-driven pipe-threading

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and cutting machine (Schedule 8941) for White Plains, Va., Station; motor-driven air compressors (Schedule 8910), one turbine-driven air compressor (Schedule 8922), fittings for steel and composition gages (Schedule 8903); until Oct. 16, air hose couplings (Schedule 8906), emergency feed, fire and bilge pumps (Schedule 8930), electric flashlights (Schedule 8997); until Oct. 20, main condenser and circulating pumps, turbine-driven, with spare parts and special tools and wrenches (Schedule 8979) for Eastern and Western navy yards.

◀ SOUTH CENTRAL ▶

Pan-American Petroleum Corp., Lorenz Street, Jackson, Miss., has plans for one-story addition, 45 x 135 ft., for storage and distribution. Cost over \$35,000 with equipment.

Lexington Brewing Co., Lexington, Ky., care of John C. Bruckmann, head of Bruckmann Brewing Co., 4125 Hamilton Street, Cincinnati, is arranging for sale of 4000 shares of preferred stock, to total over \$175,000, considerable part of proceeds to be used for purchase of equipment for new local brewery.

Glenwood Co-operatives, Inc., Napoleonville, La., care of Samuel Stone, Jr., & Co., Masonic Temple Building, New Orleans, architects and engineers, has plans for new cane sugar mill at first noted place, consisting of main refinery, centrifugal house, tank building, bagging plant, steam power house and other units. Cost over \$90,000 with machinery.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Oct. 13 for six steel intake gates for Pickwick Landing Dam, each to consist of one top and one bottom section, with lifting hooks and latch, and guide castings; until Oct. 16, 1,680,000 ft. electric cable and splicing materials for new transmission line from Pickwick Landing to Memphis, Tenn.

Board of Education, Chattanooga, Tenn., plans extensions and improvements in industrial school at Bonny Oaks, including additional equipment. Fund of \$64,400 has been arranged through Federal aid.

Town Council, Newbern, Tenn., plans installation of a municipal electrical distributing system, including transmission line to connect with system of Tennessee Valley Authority, which will furnish service, and main switching and power substation. Fund of \$105,400 is being arranged through Federal aid.

◀ SOUTH ATLANTIC ▶

Miami Springs Distilling Co., Hialeah, Fla., has plans for new distillery on Okeechobee Road, consisting of main one-story distilling unit, 100 x 200 ft., mechanical-bottling and distributing building, 60 x 150 ft., one-story administration building and other structures. Cost close to \$100,000 with equipment. W. J. Hicks is general manager.

District Quartermaster, Fort Barrancas, Fla., asks bids until Oct. 22 for three planers or jointers, four band-saws, wood-working lathe, miter-box saws and other tools (Proposal 5401-18).

Quartermaster, Fort Bragg, N. C., asks bids until Oct. 12 for 10,950 ft. metallic armored cable, potheads, cutouts, lightning arresters and other equipment (Proposal 159-32).

◀ SOUTHWEST ▶

Griesedieck Brothers Brewery Co., 1920 Shenandoah Street, St. Louis, has let general contract to Woermann Construction Co., 3800 West Pine Street, for two multi-story additions for expansion in main brew-house, mechanical-bottling, storage and distributing, and other departments. Other expansion will be carried out later. Entire project will cost over \$300,000 including

equipment. Janssen & Janssen, Chemical Building, are architects.

Braden Steel Corp., East Admiral Boulevard, Tulsa, Okla., manufacturer of hoists, winches and kindred steel products, has approved plans for one-story addition, 40 x 150 ft., for storage and distribution.

Callaway County Rural Electric Co-operative Association, Fulton, Mo., recently organized, care of M. B. Messler, Palmyra, Mo., engineer, will soon ask bids for transmission and distributing lines for rural electrification in part of Callaway County, about 110 miles, with power substation and service facilities. Fund of \$120,000 has been secured through Federal aid.

United States Engineer Office, Conchas Dam, N. M., asks bids until Oct. 14 for bulk cement conveying and handling equipment for unloading railroad hopper bottom cars, including two stationary conveyer units, two air compressors and receivers, two receiving truck hoppers, air and cement piping, complete diesel engine power units, tools and spare parts (Circular 43).

City Council, Coffeyville, Kan., has engaged Black & Veatch, 4706 Broadway, Kansas City, Mo., consulting engineers, to prepare plans for extensions and improvements in municipal electric light and power plant. Installation will include a 5000-kw. turbo-generator unit and auxiliary equipment. Fund of \$200,000 has been arranged.

San Antonio Brewing Association, 312 James Street, San Antonio, Tex., has let general contract to H. H. Moeller, 1211 Willow Street, for extensions and improvements in storage and distributing department. Installation will include tanks and other equipment. Cost over \$35,000 with equipment. Leo M. J. Dielmann, 306 East Commerce Street, is architect.

City Council, Denton, Tex., asks bids until Oct. 15 for diesel engine-generator unit and accessories for municipal electric power plant. Cost about \$100,000. W. N. Harris is city engineer.

◀ WESTERN PA. DIST. ▶

Cyclops Steel Co., Titusville, Pa., has approved plans for two one-story additions for expansion in annealing division to double present output, and for extensions in grinding division. Cost over \$80,000 with equipment. Later company will expand laboratory unit and install additional equipment.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has leased two-story building, 80 x 200 ft., to be erected at Seventh Avenue and Eleventh Street, Huntington, W. Va., by Domar Building & Development Co., last noted place, for new factory branch, storage and distributing plant. General contract has been let to C. A. Hancock, Huntington. Cost over \$50,000 with mechanical-handling and other equipment.

United States Engineer Office, Pittsburgh, asks bids until Oct. 23 for lock-operating machinery for lock and dam No. 9, Allegheny River (Circular 101).

◀ PACIFIC COAST ▶

Metropolitan Water District, 306 West Third Street, Los Angeles, asks bids until Oct. 13 for steel radial gates and gate hoists, wall plates, anchor bolts, etc., for wasteways (Specifications 172); until Oct. 15, heavy circuit breakers for main pumping plants on Colorado River aqueduct, including four three-pole breakers, 230,000 volts; 16 three-pole breakers, 15,000 volts; and nine three-pole breakers, 15,000 volts (Specifications 169). F. E. Weymouth is general manager and chief engineer.

General Paint Corporation, 2627 Army Street, San Francisco, manufacturer of paints, oils, varnishes, etc., plans rebuilding part of branch plant at 1406 Dearborn Avenue, Seattle, recently destroyed by fire. Loss close to \$100,000 with equipment.

Isaacson Iron Works, 2917 East Marginal Way, Seattle, manufacturer of automobile bodies, road machinery and parts, tractors, steel plate products, etc., has plans for new branch plant at Spokane, Wash., one-story, 120 x 150 ft., for parts production and assembling. Cost close to \$80,000 with equipment.



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